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ABSTRACT

Qualitative cross-case methodology was employed to explore the experiences of two gifted students with cerebral palsy. The following questions were investigated: (1) In what ways do these students show their intellectual abilities? and (2) What instructional strategies or techniques were especially beneficial in developing these abilities? One student was in a self-contained gifted program at the elementary level; the other in regular and college preparatory high school classes. Data collection occurred over a 3-year period and employed participant observation, interviewing, document analysis, audiotaping, and videotaping. The subjects demonstrated such characteristics as advanced academic abilities, broad base of knowledge, quickness of learning and recall, sophisticated sense of humor, curiosity, insight, maturity, desire for independence, and use of intellectual skills to cope with their disability. Instructional variables conducive to skill development included willingness of teachers to accommodate for their disabilities, mainstreaming with nondisabled students, individualization and opportunities for student choice, hands-on experiences, development of thinking skills, simulation, thematic instruction, and high-level discussion. Four assertions emerged from the cross-case analysis: (1) the difficulty in expressing and recognizing indicators of giftedness; (2) the differential impact of classroom atmosphere, structure, and instructional activities; (3) the influence of integration into regular classrooms; and (4) barriers which students must overcome to reach their goals. Appendices include samples of one student's poetry and suggestions for parents. (Contains 48 references.) (DB)

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THE NATIONAL RESEARCH CENTER ON THE GIFTED AND TALENTED

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Recognizing Talent: Cross-Case Study of Two High Potential Students With Cerebral Palsy

Colleen Willard-Holt, Ph.D.
Pennsylvania State University
Harrisburg, Pennsylvania

September 1994
Collaborative Research Study
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About the Author...

This study represents the integration of two areas of intense interest to **Dr. Colleen Willard-Holt**: education of students with disabilities and education of gifted students. She began her educational career as a teacher of special education students, received a master's degree in education with an emphasis on the gifted from Johns Hopkins University, and served as coordinator and then director of gifted programs for five years. While completing her Ph.D. in Educational Psychology at Purdue University with an emphasis in gifted education, she worked as a consultant and teacher educator in gifted education. Currently, Dr. Willard-Holt is an Assistant Professor of Education at Pennsylvania State University at Harrisburg and a consultant regarding gifted education to parents and school districts.

Recognizing Talent: Cross-Case Study of Two High Potential Students With Cerebral Palsy

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ABSTRACT

This study explored the experiences of gifted students who have cerebral palsy and are not able to communicate with speech. Qualitative cross-case methodology was employed to investigate the following questions: In what ways do these students indicate their intellectual abilities? What instructional strategies or techniques are especially beneficial in developing these abilities?

Two participants were located who met the selection criteria. One student was placed in a self-contained gifted program at the elementary level; the other was enrolled in regular and college preparatory classes at a comprehensive high school. Data collection occurred over a three-year time span, and employed these research methods: participant observation, interviewing, document analysis, audiotaping, and videotaping. Data were analyzed using analytic induction, constant comparison, open coding, axial coding, selective coding, diagramming, and cross-case analysis.

The students demonstrated the following characteristics of giftedness: advanced academic abilities (especially mathematical and verbal skills), broad base of knowledge, quickness of learning and recall, sophisticated sense of humor, curiosity, insight, maturity (shown through high motivation, goal orientation, determination, patience, and recognition of their own limitations), desire for independence, and use of intellectual skills to cope with the disability. Instructional variables conducive to the development of these skills included willingness of the teachers to accommodate for their disabilities, mainstreaming with nondisabled students, individualization and opportunities for student choice, hands-on experiences, development of thinking skills, simulation, thematic instruction, and high-level discussion.

Four assertions emerged from the cross-case analysis. In brief, these related to: (1) the difficulty in expressing and recognizing indicators of giftedness; (2) the differential impact of classroom atmosphere, structure, and instructional activities; (3) integration into regular classrooms; and (4) barriers which must be overcome in order for these students to meet their goals. Implications for educators were delineated in the hope that the abilities of more of our students may be recognized and nurtured.

Recognizing Talent: Cross-Case Study of Two High Potential Students With Cerebral Palsy

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EXECUTIVE SUMMARY

Introduction

Gifted children with disabling conditions comprise a major group of underserved, understimulated students (Karnes & Johnson, 1991). These students, in order to realize their potential, are in need of programming and curriculum differentiated from that of others who share similar disabilities, and also from that of other gifted students. A major portion of their time is often spent in remediation or learning to circumvent the effects of the disability. This concentration on the child's disability may preclude the recognition and development of cognitive abilities (Karnes & Johnson, 1991). Gallagher (1988) decried this loss of potential and placed high priority on services for gifted/disabled and other underserved subpopulations of gifted students.

This study focused on gifted students who have cerebral palsy and are unable to communicate orally. Recognizing intellectual talent in these children and subsequently developing it can enrich our lives as well as theirs. Children with other types of disabilities (e.g., hearing impairments) may exhibit similar types of indicators, which often go unrecognized. Finally, nondisabled children with intellectual talent may be demonstrating their own giftedness in manners similar to those of these children instead of the conventional behaviors teachers expect. Gaining a new perspective on giftedness and its many forms of expression will thus help educators to broaden their perspective and seek to develop the talents of more of our children.

Gifted Students With Physical Disabilities

Providing appropriate educational programming for gifted students with physical disabilities is constrained by two major obstacles: identifying the student's need for services, and designing the context and content of educational interventions which address both cognitive and physical needs.

Identification

Identification of students who are gifted and physically disabled is problematic. Neither of the customary identification methods—standardized tests and observational checklists—is adequate, without major modification, for discovering the abilities of these children since scores obtained are often much below their true potential. Children whose speech or language is impaired (e.g., due to inability to control vocal musculature) cannot respond to tests requiring verbal responses. Children with limited mobility may be unable to take nonverbal or "performance" tests requiring hand manipulation. In addition, limited life experiences due to impaired mobility may artificially lower scores (Hokanson & Jospe, 1976; Whitmore & Maker, 1985). Because gifted children try to compensate for their weaknesses, and children with disabilities often hide special abilities in order to "fit in,"

they appear closer to "average" on both dimensions (Hemmings, 1985). Another important consideration is the reference group to whom these children are compared in the identification process. Whitmore and Maker (1985) recommend that they be compared to children with similar disabilities rather than to nondisabled children.

Published lists of characteristics of gifted children (e.g., Renzulli, Smith, White, Callahan, & Hartman, 1976; Tuttle, Becker, & Sousa, 1988) typically include items such as advanced vocabulary, wide base of knowledge, quick mastery and recall of information, and greater ability to conceptualize and think abstractly. These characteristics may or may not be found to a similar extent in gifted students who are disabled, due to the limitations on experience imposed by the disability and to difficulties in receptive and expressive language resulting from the disability.

Providing Appropriate Educational Experiences

The overall goal of an appropriate education program might be conceptualized as the development of potential for exceptional achievement (Pledgie, 1982; Whitmore & Maker, 1985). A good program should simultaneously capitalize on strengths and remediate weaknesses (Karnes & Johnson, 1991; Pledgie, 1982). Through the child's IEP, opportunities to address the disability and opportunities to enhance the giftedness should be integrated.

A mainstreamed setting with opportunities to interact with nondisabled gifted children has been widely recommended (e.g., Hemmings, 1985; Maker, 1977; Whitmore, 1988; Whitmore & Maker, 1985). The educational environment should provide opportunities for the child to engage in active inquiry, to be creative and self-expressive, to share interests and knowledge with others, and to be an active member of the classroom, including sharing in classroom chores. Within the curriculum there should be planned experiences for cognitive development. Materials allowing opportunities for higher level thinking, such as analytical and creative problem solving skills, have been recommended (Hemmings, 1985; Whitmore & Maker, 1985). Pairing weak skills or knowledge areas with strengths will make the remediation process pleasant. A balance between science, humanities, and art activities (which stimulate creativity and problem solving) and basic skills training (which involves memory, drill, and practice) has been recommended (Whitmore, 1982). However, basic functions like rote memory should not be overemphasized (Whitmore, 1981).

Despite these recommendations, in-depth analyses of the impact of specific practices on individual children with particular patterns of capabilities and disabilities within public school settings have not been conducted. The purpose of this study, then, was to discover ways in which gifted/disabled students express their intellectual abilities, and classroom practices which were conducive to the development of these abilities.

Summary of Research Methods

From 1990 to 1993, Willard-Holt conducted a qualitative study to explore the following questions: In what ways do gifted children who have cerebral palsy and do not speak indicate their cognitive abilities? What teacher behaviors and instructional techniques are effective in developing their cognitive abilities? A multiple case study approach was utilized, thus facilitating comparisons of indicators of cognitive ability and the effects of classroom experiences across different educational, therapeutic, and home contexts. The ethnographic methods of participant observation and interviewing were the primary

methods used to collect data. Supporting data were gathered from sources such as audiotapes, videotapes, and documents. Data were analyzed through the procedures of analytic induction, constant comparison, open coding, axial coding, selective coding, diagramming, and cross-case analysis. For more details regarding methodology, refer to Willard-Holt (1993).

The Participants

For the main part of the study, two participants were located who met the following criteria: students of elementary and/or secondary school age (ages 6-18), who had been diagnosed as having cerebral palsy, and who used a communication mode other than speaking for more than 50% of their communicative needs.

Each of the two main participants will be described briefly. (In order to preserve confidentiality, pseudonyms have replaced all proper names.) When the study began, *Jan* was a six-year-old first grader placed in a first/second grade gifted class. He remained with the same teacher for his second grade year, and then he moved to the third/fourth grade gifted class for two years. Jan has athetoid and spastic cerebral palsy, affecting voluntary muscle movement throughout his body. He reached the ceiling score on the Peabody Picture Vocabulary Test and the Peabody Individual Achievement Test before entering school, and skipped kindergarten. He displayed the ability to read at age 3, much to the surprise of his parents. He communicates mainly through body motion and by spelling on an alphabet board. Jan is able to express himself through a rich vocabulary, and has written beautiful poetry. (Samples of Jan's poetry appear in the Appendix.)

Brad was fourteen years old and a high school freshman when he elected to participate in the study. He was enrolled in a regular education program and took a full course load consisting of college preparatory classes and general education classes. He has been on the honor roll every semester except one in sixth grade. He participated in many extracurricular activities, including managing the basketball team and serving on the student council. Brad communicates by eye-pointing at an alphabet board or by keying Morse code into a computer. He has almost no use of his hands and no recognizable speech due to athetoid and spastic cerebral palsy.

During Brad's sophomore year, he became ill and was hospitalized for several months, suffering from pneumonia, bouts of inability to breathe (resulting in a tracheotomy), and a stroke. Brad was unable to return to school due to continuing medical problems and finished his coursework at home under the tutelage of his aide.

Results

Expression of Cognitive Abilities

Assertion 1: Gifted students who have cerebral palsy and do not speak exhibit indicators of cognitive ability which are similar to those exhibited by nondisabled gifted students. However, the expression and recognition of these indicators are inhibited by communication barriers.

The primary focus of the research concerned the ways in which students with physical disabilities express their cognitive abilities. Jan and Brad displayed numerous characteristics of giftedness. Difficulties in expressing these characteristics in the absence

of conventional means of communication prevented the traits from being recognized. Both Jan and Brad developed the ability to read at an early age; Brad with the help of instruction by a preschool teacher, and Jan independently. Jan's parents did not know of this ability until a serendipitous incident brought it to light. Still they were skeptical that he was really reading with comprehension; they thought he merely had the skill to point out words.

Both Brad and Jan displayed advanced academic abilities. Brad had a record of high grades in difficult academic courses and was able to complete his schoolwork despite his physical limitations. Jan's academic abilities were enhanced by the individualization which occurred in his classroom, allowing him to progress at his own pace, which was considerably faster than even his *gifted* classmates. Yet, until the gift of an alphabet board, no one suspected the breadth of his knowledge in all subject areas or his special verbal and mathematical talents. The alphabet board was a liberating device, allowing him to demonstrate the extent of his exceptional talents.

Both Jan and Brad learned quickly, but again, no one knew how quickly until alternative forms of communication were established. Jan and Brad each had a sophisticated sense of humor; Brad displayed this mainly in comprehension and appreciation of others' humor, while Jan produced humorous writings. Brad's sense of humor was recognized early while Jan's was not recognized until he began to write.

Jan and Brad both exhibited maturity beyond what one would expect from young persons their age. This maturity was evidenced in their high levels of motivation, persistence, determination, patience, and goal orientation. It was not expressed in the ways their teachers usually thought of maturity—described by these teachers as "advanced in social interactions." Therefore, the teachers sometimes missed the indicators of maturity.

Both Brad and Jan had special talents: Brad's in art, and Jan's in writing and math. These abilities were not expressed until certain modifications had been made to overcome the limitations of the body.

Jan displayed several other characteristics not observed in Brad: insight, curiosity, ability to adapt, and desire for independence. With the possible exception of the ability to adapt, these characteristics are very difficult to recognize in a student who can neither independently explore his world nor easily communicate his thoughts and desires to those in his environment. Jan's insight was further expressed in his acceptance of a twofold mission, which he has expressed as his desire to "teach the ostriches" and to "free from silence everyone who is in silence."

Thus, there were ample indicators of Brad's and Jan's intellectual abilities, but in order for them to be expressed and recognized, various hurdles, most notably communication, had to be overcome.

The characteristics observed are consistent with well-accepted traits of gifted students. The observed characteristics of Brad and/or Jan can be compared to items on the *Scales for Rating the Behavioral Characteristics of Superior Students* (Renzulli et al., 1976), one of the most widely used rating scales for identifying gifted students. The four most commonly implemented scales are concerned with learning, motivation, creativity, and leadership characteristics. Jan's advanced academic skills and Brad's scholastic success would be rated high on items on the learning scale such as advanced vocabulary and large storehouse of information. The quickness noted in Jan and Brad is phrased on the learning scale as "quick mastery and recall of factual information." Sense of humor, which both possess in large quantity, is operationalized on the creativity scale as "displays a keen sense of humor and sees humor in situations that may not appear to be humorous to

others." Maturity is comprised of several separate factors on the motivation scale: "interested in many adult problems," "needs little external motivation to follow through," and "is quite concerned with good and bad." The latter, as well as "has rapid insight into cause-effect relationships" on the learning scale, also correlates with Jan's demonstrated insight. Curiosity appears on the creativity scale, as well as being inferred on the learning scale: "tries to discover the how and why of things." The ability to adapt is related to the leadership characteristic described as "adapts readily to new situations." Finally, the desire for independence is found on the motivation scale in the item "prefers to work independently." An additional characteristic pertaining to Brad is found on the leadership scale: "participates in most social activities connected with the school." Thus, every one of the observed characteristics is commonly accepted as an indicator of giftedness.

In addition, curiosity, persistence, motivation, goal orientation, the ability to adapt, need for independence, aptitude in specific subject areas, and early ability to read have been posited as characteristics of gifted students with physical disabilities (Whitmore & Maker, 1985). Autobiographical accounts reaffirmed these, as well as determination (Hawking, 1992; Nolan, 1987) and the ability to solve complex problems mentally (Hawking, 1992). Therefore, the results of this study are consistent with the literature regarding characteristics of gifted students with physical disabilities, as well as adding several characteristics from the lists of traits of gifted nondisabled students. However, the lists of characteristics in the literature were generated deductively and/or retrospectively; the results from observations of students in classrooms provided grounded data in support of the literature.

Effects of Classroom Experiences on Intellectual Development

Assertion 2: Classroom atmosphere, structures, and instructional activities differentially impact the intellectual development of gifted students with physical disabilities.

The relaxed, positive atmosphere and the respect for students shown in both schools facilitated Jan's and Brad's development. They felt free to take risks (intellectually and physically), and they were valued as individuals, thus fostering feelings of belonging. Recognition of their abilities by others helped to develop self-confidence.

In discussing the remaining aspects of this assertion, Jan's case and Brad's case must be discussed separately due to wide variations in classroom contexts. Jan's classrooms were structured for individualization, advanced work, and emphasis on achievement. This arrangement seemed uniquely suited to Jan: he could progress at his own pace (academically faster, physically slower); he interacted with materials at a challenging level which promoted growth; and his own task commitment was reinforced.

Certain instructional activities seemed especially beneficial for Jan. Many writing opportunities were presented, which allowed Jan to develop his writing skills and his talent for verbal expression. The spelling program allowed him to build his vocabulary, which he then employed in his writing. Hands-on activities such as science experiments and field trips were valuable in building tactile experiences often not encountered by students with disabilities. Simulations and thematic units were effective in tapping Jan's storehouse of information and in building broader understandings. The variety of experiences provided encouraged Jan's curiosity, and he finally had the opportunity to explore topics of interest based on individual choice.

It is difficult to assess Brad's school experiences fairly due to the home tutoring required by his illness. The traditional structure of his classrooms did not allow for individual pacing or individual choice of activities within classes, but the extracurricular

opportunities of which Brad availed himself and the course choices he made did allow some individual choice. Lecture and recitation made extensive participation by Brad difficult, and the modifications in expectations for the amount of written work were few. Brad, however, seemed to be very comfortable in classrooms and, before becoming ill, had no difficulty in keeping up with the workload. Perhaps the high expectations resulted in higher achievement.

It is even more difficult to discuss activities beneficial to Brad, since most of the tutoring activities were of the same form. Brad's aide reported that Brad learned best from lecture and discussion and had difficulty with textual material due to focusing problems.

These classrooms exhibited a number of characteristics which have been recommended in the literature as appropriate for gifted students with disabilities. Both were in a mainstreamed setting with opportunities to interact with nondisabled peers, as widely suggested in the literature (Hemmings, 1985; Maker, 1977; Whitmore, 1988; Whitmore & Maker, 1985). Corn (1986) suggested that students be given access to gifted programs; Jan was placed in a gifted program, while no gifted program existed in Brad's school. There was a facilitative atmosphere in both schools in which students' ideas were accepted and individuality was prized (Feldhusen & Hansen, 1987; Hultgren & Seeley, 1982). Jan's classrooms allowed for active inquiry, allowed him to be creative and self-expressive, encouraged sharing with others, and involved him as an active member of the class, as recommended by Whitmore (1982). The opportunity for higher level thinking activities (Hemmings, 1985; Whitmore & Maker, 1985) and a balance between basic skills and science, humanities, and art activities (Whitmore, 1982) were also provided in Jan's case.

Thus, it appears that many of the recommendations found in the literature were implemented, especially in Jan's case. Jan's classrooms appeared to be more conducive to the development of high intellectual abilities, and Jan appeared to flourish. His characteristics seemed well matched to the classroom context. In Brad's case, although he did achieve well, there was not the same emphasis on intellectual development, which may have enabled Brad to excel to an even greater degree.

There were some actions performed by the various teachers which seemed to be especially facilitative. Teachers in both settings involved Jan and Brad in classroom discussions and activities and had the patience to wait for them to respond. They provided individual help as needed and most were open to modifications in the curriculum to minimize physical frustration. In both settings high expectations were held for all of the students. All of these actions have been recommended in the literature (Feldhusen & Hansen, 1987; Maker, 1977; Whitmore & Maker, 1985).

Conclusion

This research investigated the manners in which gifted children with cerebral palsy and no speech manifested their cognitive abilities, and the ways in which their educational settings facilitated the development of their abilities. A number of indicators of cognitive ability were identified, and facilitative and inhibitive aspects of the educational settings were described. It is hoped that this study will contribute to the development of the potential of students with physical disabilities that limit speech—not only for the participants of this study, but those who languish unrecognized in countless classrooms.

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Appendix

Samples of Jan's Poetry

My Song

Poems are nicer than letters
Because they have a song in them.
My gift to you is the tune I write here
Listen quietly for my voice—
I may quit speaking at any moment
But I can never stop singing

News in January
(on the Persian Gulf war)

Cold stars all around.
Today they say we are going to fight far away.
Where have our young soldiers gone to hear the bells?
Please let them pray for peace
Quietly under the desert stars.

Pilgrims in the Night

Domes of the cathedral gleam in the moonlight
Questing pilgrims, hoods pulled low,
Pass my cozy bed.
Where in the wide world
Might they be going?

Lost Seeds

Poems are meant to be pomegranates
Like my poems for no one.
Days go by because I just forget
    how I felt.
Poems can steal no one's imagination
When they rot on the tree
    like unpicked fruit.

Christmas Poem

Santa Claus brings joy to girls and boys.
Antlers gleam in the light. What a lovely sight.
Night of wonders and delight.
The star of Christmas shines above.
All the world wrapped in love.

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Recognizing Talent: Cross-Case Study of Two High Potential Students With Cerebral Palsy

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Introduction

Gifted children with disabling conditions comprise a major group of underserved, understimulated students (Karnes & Johnson, 1991). These students, in order to realize their potential, are in need of programming and curriculum differentiated from that of others who share similar disabilities, and also from that of other gifted students. A major portion of their time is spent in remediation or learning to circumvent the effects of the disability. This concentration on the child's disability may preclude the recognition and development of cognitive abilities (Karnes & Johnson, 1991). Gallagher (1988) decried this loss of potential and placed high priority on services for gifted/disabled and other underserved subpopulations of gifted students.

There is a significant discrepancy between the measured academic potential of these students and their actual performance. Their academic achievement may be lowered due to one or more of three factors: the effect of the disability on the pattern of cognitive development, the concealment of superior intellect by the disability, or placement in an educational setting focused on remediation rather than on stimulation and development of giftedness (Whitmore, 1987). Such placement puts students at risk for learning difficulties, the most notable of which is underachievement (Whitmore, 1988).

Yet, there has long been recognition of those rare individuals who have attained eminence in spite of seemingly insurmountable obstacles. Helen Keller, Beethoven, Franklin Roosevelt, Christy Brown, Einstein, and Braille are well-known examples. Of the 400 persons studied in the book *Cradles of Eminence*, 100 were disabled in some way (Goertzel & Goertzel, 1962).

Recently there has been increased interest in this population. Research by the U.S. Office for Handicapped Individuals (1976) concerning children with various types of disabilities found that 12% of the disabled children involved in the study were gifted—three times as many as in the general school population. Sixteen states have special provisions for disabled gifted students as defined by state policies (Jordan, 1988). Entire issues of periodicals related to gifted education have been devoted to those gifted children with disabilities (e.g., *Roeper Review* [September, 1989], *GCT* [May/June, 1988]). The National Association for Gifted Children has included gifted students with disabilities under the Special Populations strand. Finally, the Jacob Javits Act (1988) has specifically encouraged research and programming for this underserved, underidentified population of gifted students, including those with disabilities. Despite the current attention, little research has focused on the manners in which gifted students with disabilities express their cognitive potentials. This is particularly true of those students with physical disabilities which mask their giftedness.

This study focuses on gifted students who have cerebral palsy and are unable to communicate orally. Recognizing intellectual talent in these children and subsequently developing it can enrich our lives as well as theirs. Children with other types of disabilities (e.g., hearing impairments) may exhibit similar types of indicators, which often go

unrecognized. Finally, nondisabled children with intellectual talent may be demonstrating their own giftedness in manners similar to those of these children instead of the conventional behaviors teachers expect. Gaining a new perspective on giftedness and its many forms of expression will thus help educators to broaden their perspective and to seek ways to develop the talents of more children.

Cerebral Palsy

Since this paper deals with a small population and a condition that is not well understood by mainstream educators, a brief description of cerebral palsy in its various manifestations will be presented. Perlstein (1949) defined cerebral palsy as follows:

> A condition, characterized by paralysis, weakness, incoordination, or any other aberration of motor function due to pathology of the motor control centers of the brain. (p. 125)

Cerebral palsy is a noncurable, nonfatal, nonprogressive condition which is amenable to therapy (Sigelman, 1977). In addition to difficulties in coordination and motor control, persons with cerebral palsy might have a number of associated problems: deficits in the oropharyngeal area, speech impairments, lack of control of the eye muscles, visual impairments, hearing impairments, visual perceptual problems, loss of tactile discrimination or proprioceptive sensation, learning problems, cognitive deficits, or seizures (Jones, 1983).

There are several types of cerebral palsy, and several different methods of classifying them. The clinical or physiological classification system is based on postural and movement characteristics, and includes the categories of spasticity, athetosis, ataxia, rigidity, and tremor (Jones, 1983; Newton, 1977; Sigelman, 1977). Spasticity affects approximately 50% of persons with cerebral palsy, and is characterized by stiffness, contracted muscles, hyperactive reflexes, hypertonicity, clonus, absence of balance, and jerky uncontrolled movements. Spasticity is caused by a lesion in the cerebral cortex. Athetosis, which accounts for about 25% of cerebral palsy cases, is caused by a lesion in the basal ganglia. Athetosis affects the joints, causes lack of gross directional control and uncoordination, and is characterized by uncontrolled, jerky, irregular, twisting, or wormlike movements. The person who has athetosis may seem to be in constant, purposeless motion. Ataxia, affecting 9% of those with cerebral palsy, is caused by a lesion in the subcortical area of the brain—the cerebellum. This causes a disturbance of balance so that movement is reeling and uncoordinated. Rigidity, which may affect up to 15% of those with cerebral palsy, arises from a diffuse, widespread lesion. It is characterized by increased resistance to passive movement. Tremor is quite rare, and is characterized by regular rhythmic movements of the extremities or trunk. Mixed types are also possible (Cruickshank, 1976; Jones, 1983; Sigelman, 1977).

In some types of cerebral palsy damage has occurred in the motor control centers of the brain rather than the information processing centers; therefore, cognitive impairment is *not* a necessary concomitant of the condition. The range of intelligence test scores in a person with cerebral palsy has been a matter of a good deal of investigation over the years. Cruickshank (1976) stated that 50-75% of individuals with cerebral palsy were below the dull-normal range. Vernon (1970) stated that while previous studies had rated 86% of persons with cerebral palsy as below average in intelligence, his study found that almost half had average or better IQs. Sigelman (1977) found that only 4% of persons with

cerebral palsy had IQ scores greater than 110, as compared to 24% in the general population. He reported that 33% of persons with cerebral palsy were "mentally normal."

Whatever percentage is "true," there exist persons with cerebral palsy who are gifted. The purpose of this study was to describe ways of identifying and nurturing giftedness in this population. However, major obstacles exist.

Gifted Students With Physical Disabilities

Providing appropriate educational programming for gifted students with physical disabilities is constrained by two major obstacles: identifying the students' need for services, and designing the context and content of educational interventions which address both cognitive and physical needs.

Identification

Identification of students who are gifted and physically disabled is problematic. Neither of the customary identification methods—standardized tests and observational checklists—is adequate, without major modification, for discovering the abilities of these children since scores obtained are typically much below their true potential. Children whose speech or language is impaired (e.g., due to inability to control vocal musculature) cannot respond to tests requiring verbal responses. Children with limited mobility may be unable to take nonverbal or "performance" tests requiring hand manipulation. In addition, limited life experiences due to impaired mobility may artificially lower scores (Hokanson & Jospe, 1976; Whitmore & Maker, 1985). Because gifted children try to compensate for their weaknesses, and children with disabilities often hide special abilities in order to "fit in," they appear closer to "average" on both dimensions (Hemmings, 1985). Disabling conditions may slow the pace of cognitive development; furthermore, the students may not express their cognitive abilities in ways which are recognized by teachers. Their methods of communicating are often misinterpreted by those in their educational environments. The amount of dependence on others necessary for these children to cope with the effects of their disabilities may be mistakenly attributed by teachers to immaturity. Disabilities may also limit their ability to produce the quantity of work expected of high achievers (Whitmore, 1986). Intellectual abilities also may not be displayed due to lack of opportunity, since the student's educational placement may focus exclusively on remediation of disabilities. Thus, the environment may not be sufficiently stimulating or may not include content conducive to the expression of higher cognitive abilities, including problem solving or creative thinking abilities (Whitmore, 1981, 1986). Another important consideration is the reference group to whom these children are compared in the identification process. Whitmore and Maker (1985) recommend that they be compared to children with similar disabilities rather than to nondisabled children. In summary, Karnes and Johnson (1991) identified barriers to identification of gifted students with disabilities in the following categories: inappropriate identification procedures, faulty expectations, developmental delays, gaps in information, lack of models and research, gaps in professional training, failure to disseminate information effectively, lack of supportive equipment, lack of appropriate career counseling, and inadequate funding for education. For these reasons, current identification practices for gifted programs often overlook these students who do not fit the mold of the stereotypical gifted child.

There are a variety of measures which may be used appropriately to assess the cognitive abilities of students with physical limitations. Standardized tests which may be adapted for use with this population include parts or all of the following: Columbia Mental

Maturity Test (recommended by Allen & Jefferson, 1967, and Barnett, 1982), Detroit Test of Learning Aptitude-2 (Gearhart & Willenberg, 1980), Kaufman Assessment Battery for Children (Taylor, 1984), McCarthy Scales of Children's Abilities (Taylor, 1984), Peabody Picture Vocabulary Test (Whitmore & Maker, 1985), Raven's Progressive Matrices (Whitmore & Maker, 1985), the Stanford-Binet Form L-M (Allen & Jefferson, 1967; Barnett, 1982), and certain subtests (mazes, block design, picture arrangement and object assembly) of the WISC-R (Allen & Jefferson, 1967; Barnett, 1982). On the WISC or Stanford-Binet, verbal scores often are higher than performance scores, and examiners should be aware that performance may be affected adversely by motor, vision, and speech impairments. Certain adaptations in test administration may be necessary. These modifications are not intended to make the tests easier, but rather to make it possible for students to demonstrate their abilities (Hokanson & Jospe, 1976). Time limits should be waived, and responses to multiple choice items may be indicated by blinks or nods (Whitmore & Maker, 1985). All of these instruments require that the examiner take into consideration the task to be performed in conjunction with the child's physical capabilities and modify the procedure accordingly. Such modifications will affect the results of the testing and restrict the use of norms and standardization samples for comparison. It is for this reason that these children should be individually assessed by an experienced psychologist.

Thus, there are a number of psychometric instruments which may be appropriately utilized by psychologists to identify giftedness in students with disabilities. Since it is desirable to use a variety of formal and informal measures to identify students for gifted programs, informal measures such as observational checklists must be considered next. A number of lists of characteristics of gifted children may be found in the literature (e.g., Renzulli, Smith, White, Callahan, & Hartman, 1976; Tuttle, Becker, & Sousa, 1988). These lists of characteristics typically include items such as advanced vocabulary, wide base of knowledge, quick mastery and recall of information, and greater ability to conceptualize and think abstractly. These characteristics may or may not be found to a similar extent in gifted students who are disabled, due to the limitations on experience imposed by the disability and to difficulties in receptive and expressive language resulting from the disability.

Characteristics of gifted students with disabilities often include the following: superior memory, outstanding reasoning powers and problem solving skills, exceptional perseverance, and high levels of curiosity (Whitmore, 1986). Characteristics specific to gifted students with various disabilities have also been generated, mostly from retrospective studies and theoretical deduction (Pledgie, 1982; Whitmore, 1981; Whitmore & Maker, 1985). Students with physical disabilities have the same range of ability as in the general population, although in the presence of some conditions the frequency pattern of IQs may be altered (Maker, 197.). Gifted children with physical disabilities often learn or develop compensatory skills that enable them to achieve success. They often display creativity in finding alternative ways of communicating and accomplishing tasks. They may have an impressive store of knowledge. They frequently have superior memories and exceptional problem solving abilities. They generally set long-term goals and display persistence and motivation to achieve. They are often severely self-critical and perfectionistic (Whitmore & Maker, 1985). However, physical disabilities limit achievement until coping skills are learned (Whitmore, 1986; Whitmore & Maker, 1985). The disabilities disrupt the usual pattern of development, and limit experiences with the environment. Reduced sensorimotor and perceptual motor learning experiences lead to language and cognitive skills not based on motor experiences (manipulation). This in turn may lead to some difficulties in cognitive development and in dealing with abstractions, if it is indeed true that abstract thought is rooted in concrete experience, as suggested by Piaget (1954). Also,

lack of experience with the environment leads to a limited opportunity to observe and imitate models (Hokanson and Jospe, 1976).

A key point is that characteristics of giftedness in children with disabilities have not been systematically related to actual observations of children but rather have been generated retrospectively by adults reflecting on their childhood experiences.

A second source of characteristics of gifted students with physical disabilities is published biographies or autobiographies. Characteristics from these sources include the ability to solve complex problems mentally (Hawking, 1992); determination (Hawking, 1992; Nolan, 1987); aptitude in specific subject areas, persistence, the need for independence, the development of skills to compensate for the disability, and the early ability to read (Whitmore & Maker, 1985).

The problems in recognizing indications of cognitive ability and nurturing that ability in children who are disabled are geometrically increased when the child is unable to communicate orally. Language is our most reliable informal indicator of giftedness, since it is a revelation of thinking (Whitmore, 1986). Children who do not speak cannot respond to a teacher's questions, explain their thinking processes, satisfy their curiosity by asking questions, or display leadership abilities in conventional ways. The pattern of their interactions in the classroom is far different from that of children who speak. They must rely on others (human or mechanical) to interpret for them.

Providing Appropriate Educational Experiences

Mauser (1981) stated that schools have a twofold function in regard to gifted children with disabilities: to provide intellectually meaningful opportunities allowing them to learn and achieve academically, and to provide affectively meaningful experiences allowing them to develop understanding of themselves, both individually and in relation to other people. The overall goal of an appropriate education program might be conceptualized as the development of potential for exceptional achievement (Pledgie, 1982; Whitmore & Maker, 1985). A good program should simultaneously capitalize on strengths and remediate weaknesses (Karnes & Johnson, 1991; Pledgie, 1982). Through the child's IEP, opportunities to address the disability and opportunities to enhance the giftedness should be integrated.

A mainstreamed setting with opportunities to interact with nondisabled gifted children has been widely recommended (e.g., Hemmings, 1985; Maker, 1977; Whitmore, 1988; Whitmore & Maker, 1985). Access to gifted programs should be considered an educational right (Corn, 1986). Such a setting may help to alleviate the isolation and alienation felt by gifted/disabled children (Whitmore, 1988). Spending more time with nondisabled students will help students with disabilities to learn adaptive behaviors more quickly, and it will help to prepare students for a later role in the real world (Maker, 1977). Other advantages include chances to realize higher educational and career goals, to receive support and encouragement from peers, to minimize frustration and strengthen self-confidence, as well as to heighten awareness on the part of nondisabled peers of the abilities of disabled persons (Hemmings, 1985).

The educational environment should provide opportunities for the child to engage in active inquiry, to be creative and self-expressive, to share interests and knowledge with others, and to be an active member of the classroom, including sharing in classroom chores. The attitude that diversity is valued should prevail in all activities (Whitmore, 1982).

Within the curriculum there should be planned experiences for cognitive development, rather than a curriculum focused on remediation. Sensory experiences using noninvolved modalities and opportunities with manipulatives provide the basis for expressiveness and abstract thinking. The Taba Concept Development Strategy has also been effective, as has the creative problem solving approach (Whitmore & Maker, 1985).

Learning materials should be interesting and challenging, and should satisfy the child's desire for humor and fantasy (Whitmore, 1982). Materials allowing opportunities for higher level thinking, such as analytical and creative problem solving skills, have been recommended (Hemmings, 1985; Whitmore & Maker, 1985). The level of difficulty should allow for success without excessive repetition. The structure of the materials should promote efficiency in learning. If not overused, the pairing of weak skills or knowledge areas with strengths may enhance remediation. A balance between science, humanities, and art activities (which stimulate creativity and problem solving) and basic skills training (which involves memory, drill, and practice) has been recommended (Whitmore, 1982). However, basic functions like rote memory should not be overemphasized (Whitmore, 1981).

While many of these recommendations would appear generic to any gifted program, the key to addressing the gifted/disabled lies in transcending the physical limitations while simultaneously allowing the cognitive talents to blossom. Using highly developed thinking skills to promote coping strategies, providing the basis for abstract thinking in concrete experiences unavailable to the child without assistance, and compacting areas in which the child demonstrates mastery (thereby eliminating boredom as well as physical labor) are examples of instructional strategies that address both types of exceptionality.

The teacher of gifted students who have disabilities must be flexible yet consistent enough to address intellectual needs while developing areas of weaknesses (Whitmore & Maker, 1985). The teacher should demonstrate consistently high expectations of the gifted/disabled child (Maker, 1977). Additional teacher behaviors designed to encourage the development of gifted potential have been widely discussed in the literature (e.g., Feldhusen, 1985; Feldhusen & Hansen, 1987; Hultgren & Seeley, 1982; Raths, Wassermann, Jonas, & Rothstein, 1986). Central to these behaviors is maintaining a facilitating atmosphere by listening to students and accepting their ideas, appreciating individuality, encouraging open discussion, promoting active learning, nurturing confidence and independence, and promoting higher level thinking skills. While there is consensus that these are valuable for gifted students in general, these techniques have not been studied for their particular applicability to gifted students with disabilities.

Several exemplary programs for gifted students with disabilities have synthesized and put into practice many of the above recommendations. These include the RAPYHT program (Karnes, 1984), the Chapel Hill Gifted-Handicapped Project (Leonard & Cansler, 1980), SEARCH (Maker, 1977), and the Rural School Gifted and Talented Program for Handicapped Children (Porter, 1982). The RAPYHT program, for example, seeks out preschool children who are disabled and talented, identifying them mainly through ongoing observations of their responses to carefully structured thinking activities. The program specialist then provides appropriate instruction to develop talents in intellectual, creative, artistic, and other fields, consults with parents on activities to complete at home, and prepares recommendations for programming when the child enters school.

Impressive successes were recorded by each of the above programs. Yet in-depth analyses of the impact of specific practices on individual children with particular patterns of capabilities within public school settings have not been conducted.

Summary of Research Methods

From 1990 to 1993, Willard-Holt conducted a qualitative study to explore the following questions: In what ways do gifted children who have cerebral palsy and do not speak indicate their cognitive abilities? What teacher behaviors and instructional techniques are effective in developing their cognitive abilities? A multiple case study approach was utilized, thus facilitating comparisons of indicators of cognitive ability and the effects of classroom experiences across different educational, therapeutic, and home contexts. Participants were selected on the basis of educational achievements in addition to psychometric data, and informed consent procedures were followed prior to data collection. The roles of the researcher as the primary research instrument included participant observer, interviewer, and analyst. The ethnographic methods of participant observation and interviewing were the primary methods used to collect data. Supporting data were gathered from sources such as audiotapes, videotapes, and documents. A number of safeguards were employed to enhance the validity and reliability of the results. For more details regarding methodology, refer to Willard-Holt (1993).

Data Analysis Strategies

Fieldnote data were divided into meaningful segments (units of analysis), usually consisting of an interactive event or portion thereof. The following excerpt from fieldnotes will illustrate:

> Mrs. Zastrow has brought a coffeepot full of hot water. They are going to measure the temperature of the water every 15 minutes from 9:00-10:00. Each pair of students will have two cups made of different materials. They will record their answers on a chart she has run off for them. (She tells me that later that day they will graph the data, and that she hopes that they will have a better idea of what to do than when they tried to graph the information from the cups of ice.)
>
> Mrs. Zastrow draws the scales on the board to show the children how to read them.
>
> She tells Alison, Lew, and Jan to pay attention.
>
> On the Celsius scale, there are numbers like 10, 20, 30, with 10 marks between, the middle one slightly longer—each mark stands for one degree. Michelle points out that this is just like a clock. (Fieldnotes, 10/4/90, pp. 1-2)

When the fieldnotes were typed, double spaces were used between units of analysis. (In some cases, further analysis revealed that additional subdivisions were needed, and they were made at that time.) In the above excerpt, the first unit of analysis gave the context for the subsequent instruction. In the second, instruction began. The third unit consisted of a disciplinary statement. The fourth unit revealed an attribute of Michelle—she made a relationship to previous knowledge.

The data analysis process began with analytic induction (Goetz & LeCompte, 1984). The data were read repeatedly until categories of phenomena and relationships among them emerged. Categories and their properties were further defined through the constant comparative method (Glaser & Strauss, 1967). This method requires that incidents be coded by category (generated by analytic induction), compared with each other, and finally compared with the properties of the category. In order to facilitate this process, multiple copies of fieldnotes and interview transcripts were made. One copy was cut apart, with each unit of analysis on a separate slip of paper. The slips were then

arranged into groups. In order to place a slip in a group, it was compared with the other slips already in the group. If it seemed conceptually related, it joined the group. If not, the next group was examined, and so on, until a match was found. If no match was found, the slip started a new group. After a time, the groups were given names which represented the conceptual basis for the grouping; these names became provisional categories. This process continued until no new dimensions of the categories were emerging; in other words, the categories became saturated.

In the course of the analysis, certain segments of data emerged as particularly significant, because they were illustrative of categories central to the analysis (potential core categories). These segments of data were analyzed in more detail. Open coding (Strauss, 1987) was carried out for each phrase within the data segment, as illustrated below for an introductory sentence of a significant incident:

> At OT at the hospital last Friday and his therapist had a woman visiting who was borrowing equipment. (Interview, Jan's mother, 9/27/90)

Phrase	Open coding
At OT	Use of abbreviation suggests familiarity. Therapy—there is no cure, but there are measures that can ameliorate the situation.
at the hospital	The connotation of the condition as an illness. Feelings associated with going to the hospital when one is not sick?
last Friday	This was one in a series of instances; therapy is a continuous process.
and his therapist	This suggests that there is a long-term relationship with the therapist. He has seen a particular therapist for awhile.
had a woman visiting	This was a somewhat unusual instance—worthy of comment. The therapy session is private, yet visitors are allowed. Are observers dehumanizing to the client, or are the clients pleased to be able to "show off"?
who was borrowing equipment	This shows a willingness on the therapist's part to share—a desire to help others.

This coding then resulted in or supported previously identified categories of importance to the developing theory.

Next, axial coding was employed. In axial coding one attempts to build a network of relationships called properties for a given category. The category is first dimensionalized, by considering varieties of conditions, strategies, interactions or consequences that might be associated with the category or which might alter the manifestation of the category. Then the category is related to other categories in order to build conceptually dense theory (Strauss, 1987). In this study, I searched the data for other instances of the provisional category, and noted their contexts, consequences, and conditions as a way of dimensionalizing the category. For example, in the case of Jan, the

following properties contributed to the development of the feelings category: love of school, desire to be like everyone else, loneliness and misunderstood, and frustration. I then used diagrams to show the interrelationships among the dimensions of the category. These diagrams became more and more sophisticated and complex as the interrelationships became clear.

For those categories that eventually became central to the emerging theory (core categories), I employed selective coding, systematically linking other categories and subcategories to the core. Further diagramming was done, integrating the previous diagrams to better represent the complexity of the situation (Strauss, 1987).

After the analysis of each case was completed, a cross-case analysis was conducted. The categories and explanations posed for each case were compared and contrasted across the cases. A matrix was employed to summarize the major points of comparison. Patterns were analyzed to explain the interrelationships between variables (Merriam, 1988; Yin, 1989). Similarities and differences between categories emerging for Jan and Brad were described. The patterns of categories for the two cases were then compared. Finally, relationships between the two core categories were explored.

The remainder of this monograph will describe findings of this study and delineate implications for teachers based on the findings.

The Participants

For the main part of the study, two participants were located who met the following criteria: students of elementary and/or secondary school age (ages 6-18), who had been diagnosed as having cerebral palsy, and who used a communication mode other than speaking for more than 50% of their communicative needs. Potential participants were to have been identified by their parents and/or school districts as having high intellectual abilities. Identification could include a blend of traditional and nontraditional methods such as the following: standardized tests, anecdotal accounts of unusual abilities reported by parents, school achievement, creation of products of excellent quality, attainment of academic honors, and recognition by teachers and classmates of unusual ability (as evidenced by election to positions of leadership, for example). As described in the section on identification in the review of literature, scores on standardized tests may be misleading and observational checklists may be limited in applicability; thus more credence has been placed in the accomplishments of the participants.

In all, four students participated in the study. Two of these participants were not included in the final study for two reasons: they had not yet developed a means of communicating, and their classroom settings inhibited the expression of cognitive abilities. Each of the two main participants will be described briefly. (In order to preserve confidentiality, pseudonyms have replaced all proper names.) When the study began, *Jan* was a six-year-old first grader placed in a first/second grade gifted class. He remained with the same teacher for his second grade year, and then moved to the third/fourth grade gifted class for two years. Jan has athetoid and spastic cerebral palsy, affecting voluntary muscle movement throughout his body. He reached the ceiling score on the Peabody Picture Vocabulary Test and the Peabody Individual Achievement Test before entering school, and skipped kindergarten. He displayed the ability to read at age 3, much to the surprise of his parents. He communicates mainly through body motion and by spelling on an alphabet board. Jan is able to express himself through a rich vocabulary, and has written beautiful poetry. (Samples of Jan's poetry appear in Appendix A.)

Brad was fourteen years old and a high school freshman when he elected to participate in the study. He was enrolled in a regular education program and took a full course load, consisting of college preparatory classes and general education classes. He has been on the honor roll every semester except one in sixth grade. He participated in many extracurricular activities, including managing the basketball team and serving on the student council. Brad communicates by eye-pointing at an alphabet board or by keying Morse code into a computer. He has almost no use of his hands and no recognizable speech, due to athetoid and spastic cerebral palsy.

During Brad's sophomore year, he became ill and was hospitalized for several months, suffering from pneumonia, bouts of inability to breathe (resulting in a tracheotomy), and a stroke. Brad was unable to return to school and finished his coursework at home under the tutelage of his aide.

Through the auspices of the special education program and as required by their IEPs, both Jan and Brad were assisted at school by full-time aides, named Jenny and Pam, respectively. These aides served as surrogate bodies and voices for Jan and Brad, and allowed them fairly normal participation in classes. Jenny and Pam also fulfilled a multitude of other roles, including therapist, nurse, and liaison to parents, students, and teachers. Neither Jenny nor Pam had received any formal training, and learned "on the job" with assistance from the boys' families and itinerant therapists.

Indicators of Giftedness

Brad and Jan exhibit many indicators of giftedness. Some of these indicators appear on published lists of characteristics of giftedness, although Brad and Jan may express them differently due to limitations in speech and movement. Other indicators appear to be unique to gifted/disabled children, and some of these are critical for the development of giftedness in the presence of a disability.

A chart summarizing the cognitive characteristics of Jan and Brad appears in Table 1. These characteristics will be described below, some accompanied by illustrative instances of their expression by one or both of the participants. These instances are drawn from extensive observations of the participants in their learning environments and from interviews with Brad and Jan, their parents, teachers, classmates, and aides.

Early Evidence of Ability

Brad's mother described ways in which Brad indicated his intelligence at an early age:

> Mother: . . . He could understand what the grown-ups were saying and stuff and he might laugh when he was supposed to. It's just he couldn't communicate with them but . . . you could tell by his reactions. (Interview, 10/2/90, p. 8)

Before kindergarten, Brad was able to follow and appropriately respond to conversation among adults. He was not able to interact due to the communication barrier, but he indicated by nonverbal means that he understood.

Table 1

Intellectual Abilities of Jan and Brad

JAN	BRAD
Early reading ability	Early reading ability
Advanced academic skills	Scholastic success
Quickness	Quickness
Sense of humor	Sense of humor
Maturity	Maturity
Persistence	Motivation
Determination	Determination
Patience	Patience
	Goal orientation
Insight	
Curiosity	
Ability to adapt	
Desire for independence	
	Artistic ability

Jan's mother related similar impressions of Jan's ability to understand things at an early age:

> It just seemed like the kid was hearing you and seeing you or getting it or chuckling. Or he would laugh at himself in the mirror—he recognized his face in the mirror when he was at two or three months old. . . . When he was smaller he had a train that goes click, click, click, click, click—a Fisher Price toy or whatever. And we tied a string with a jar ring on the end of it. And again, [we would] hold him in the lap and he would reach over and grab it, and it was clear that he understood cause and effect early on. (Interview, September 27, 1990)

Jan's and Brad's mothers noticed that their sons were alert and able to comprehend at an advanced level what was happening around them. They seemed able to understand cause and effect, without the physical experience of manipulating the environment. Theoretically speaking, they seemed to have skipped Piaget's sensorimotor stage and learned at a very young age to represent events mentally.

Early Reading Ability

Both Jan and Brad demonstrated the ability to read at an early age. In an interview, Jan's mother related the discovery of Jan's ability to read:

> One afternoon when I was tired after teaching all day, [I came] home and still had all these hours to be with this little guy. And I just spelled out cow and frog on the [magnetic tray. I said,] "Well, Jan, which animal is green?" And he just jumped up in my arms and went {slaps hand on the table}. And letters flew all over the place but he said "Frog." And [I said,] "O my gosh, Jan, which one says moo?" Cow. A major breakthrough when your child is 3 years old. (Interview, Jan's mother, 9/27/90)

Early reading ability in and of itself is not necessarily indicative of giftedness in the nondisabled population, since young children may be systematically taught to read by parents. However, in these cases, the participants were not taught to read but somehow developed the ability to do so on their own. This is especially unusual when one considers that neither Brad nor Jan could interact independently with books; they did not have the motor skills to hold the book or turn the pages, much less find a book themselves.

Vocabulary

Receptive vocabulary may be quite reliably measured by an instrument such as the Peabody Picture Vocabulary Test. When testing children such as Brad and Jan, the administration procedure must be modified in order for them to respond. A pointing technique may be used, or the examiner may point to each response in turn and have the student indicate yes or no with a movement such as an eye blink.

Assessing expressive vocabulary is more problematic. It is crucial to remember when considering the vocabulary capabilities of children who do not speak that there must be a reliable way for them to express that vocabulary. Jan, whose vocabulary is extraordinary, had no way of expressing that vocabulary until his first grade teacher came up with the idea of using an alphabet board to spell out his answers. She described how that came about:

> When they came in to talk about the fact that he was going to be in the class and how he had been tested, the idea of multiple choice came up and that he had in fact touched cards on the floor and had been able to move his body enough to do that. . . . What I really did was took the biggest numbers, four inch numbers . . . spread those out in a space where he could reach from one end to the other . . . I didn't have any idea at all if it would work. Then, of course, being an optimist, I just figured ok, if we can do numbers let's see if we can do letters, and I did those before he ever came the first day just because I thought ok, we'll have something we can try, and it worked. I mean, that's all I can say. It worked and it was great and it really was like Christmas everyday because it was the first chance he'd ever had to tell people things. (Interview, 7/2/92, p. 3)

The teacher's optimism created the first bridge for Jan's intellect to cross over and be recognized. As she said, prior to that he had had to settle for multiple choice responses provided by another person. Now he could initiate conversation.

Jan hurtled over that bridge. The teacher told of an incident that happened the second week of school, when Jan had just received the alphabet board:

> Early in the school year we studied light and shadow. The children read a passage about Thomas Edison taken from Childcraft and responded to a worksheet about the article. One of the questions was "Why did Edison work so hard to get the air out of the light bulb?" The going answer from the class was "so the light bulb would not burn up." Jan's response was "to make the mechanism work better." The last question was "What characteristics do you think a person needs to become a successful inventor?" The going answer was "to have lots of ideas." Jan's response was "to be dedicated." Not only did I no longer worry about Jan's understanding—I knew Jenny was not feeding him answers. No adult would suggest words like "mechanism" and "dedicated" to a six-year-old. (Presentation by Jan's first grade teacher, 10/15/91, p. 5)

This incident demonstrates several things. First, Jan was able to spell these sophisticated responses having only had the alphabet board for a few days. He grasped this new way of communicating very quickly. Second, Jan knew how to spell and correctly use complex vocabulary. Third, the teacher had been worried about his understanding and about Jenny "feeding him answers." She still was uncertain about his intellectual ability, even in the face of hard evidence like test results; this incident proved to her that he was indeed very bright.

Writing Ability

Jan employed his vocabulary in his writing. Jan is a poet, and his verbal skills are showcased in his poetry:

Lost Seeds

Poems are meant to be pomegranates
Like my poems for no one.
Days go by because I just forget
how I felt.
Poems can steal no one's imagination
When they rot on the tree
like unpicked fruit.

Pilgrims in the Night

Domes of the cathedral gleam in the moonlight
Questing pilgrims, hoods pulled low,
Pass my cozy bed.
Where in the wide world
Might they be going? (Fieldnotes, 9/13/90, p. 2)

Jan's teachers called his choice of language "extraordinary," especially for an eight-year-old! The selection of the vocabulary and the use of words to create mental images is certainly sophisticated.

Jan's prose writing also is quite advanced. The following is an excerpt from a letter Jan wrote in the course of a simulation on state history. The letter is dated October 21, 1816.

> Straight away Pa went to the land office to buy a homestead. Ma said eighty dollars was a mite high, but we did get water and some prairie land. After giving thanks, we young uns emptied the wagon. Pa built a lean-to and Ma set a fire. (Fieldnotes, 10/28/91, p. 2)

Jan was able to capture the flavor of his idea of "pioneer talk," reminiscent of Laura Ingalls Wilder. Few writers at his age, or even several years older, would be able to make a dialect sound as natural as this.

Jan's writing selections were spelled out, letter by letter, on the alphabet board, and transcribed by either his parents or his aide. This was quite time and energy intensive, and his teachers often relaxed due dates to accommodate.

Brad's writing abilities were not apparent in the study. His mother commented that he chose to take the regular English class rather than the college preparatory class because of the amount of writing involved in the college prep class. Brad's communication methods, eye pointing to letters or entering Morse code with a head switch, were both extremely ambiguous and fatiguing; he could write only about three sentences in an hour. This is mentioned as a cautionary note—do not assume that the student has little writing ability simply because the communication mode is inadequate and/or the student chooses not to write.

Mathematics Ability

Both Brad and Jan demonstrated advanced mathematical abilities, albeit in different ways, and both different from expression by nondisabled children.

At the beginning of first grade, Jan knew many mathematical concepts which no one had taught him:

> His teacher says that he knows lots of things that no one taught him, and she wonders how he learned them. He has pretested in math up to the sixth chapter of the third grade book. He knew how to measure quarts and gallons, how to make change. In fact, the only thing he missed were the > and < signs. He can do the subtraction of four-digit numbers in his head by doing the total answer—he doesn't do it in parts the way the rest of the class does. (Fieldnotes, 3/15/90, p. 11)

I witnessed Jan doing subtraction as well as multiplication holistically, from left to right:

> This page has on it a function table, for which Jan must supply the function. Jan indicates the operation in the manner indicated above, then gives the answer as a whole. For example,
>
> | Input | Output |
> |---|---|
> | 245 | 617 |
>
> Jan touches 1 for add, then 3,7,2. He does not figure the answer in columns, but as a whole. (Fieldnotes, 3/15/90, p. 6)

> Jan is doing a multiplication page. Here is a list of the problems and a record of what Jan points to:
>
> | | |
> |---|---|
> | 400 x 7 | 2,8,0,0 |
> | 2x34 | 6,8 |
> | 3x26 | 7,8 |
> | 4x19 | 7 pause (Jenny: 70 what? or just 70? |
> | | 6 |
> | 2x45 | 9,0 (looking at girls at German table) |
> | 4x49 | 1,9,6 |
>
> Note that Jan gives his answers from left to right and begins to answer almost instantly. (Fieldnotes, 10/4/90, p. 4)

This ability to compute mentally so rapidly was extremely unusual for a child of this age. His first grade teacher struggled to explain it:

> She feels that he is using the distributive property—doing 40 x 6 + 9 x 6 for example. [The teacher] also mentions that Jan misses the math workbook in the afternoon [due to therapy] and that is fine because he doesn't need it. (Fieldnotes, 10/4/90, p. 5)

The ability to apply this principle, having not been taught how to use it, shows mathematical reasoning ability. His teacher adapted for this mathematical precociousness by allowing him to surge forward at his own pace. In first grade he finished the third grade math book (Fieldnotes, 3/22/90), and in third grade he worked at the fifth grade level (Fieldnotes, 2/5/92). He was still far ahead of his classmates in third grade; while they worked on temperature, measurement, money, subtraction, or multiplication of a three-digit by a one-digit number, Jan was subtracting fractions with unlike denominators.

Jan's mathematical ability also was not recognized until he went to school, and until he had a means to express what he knew. His computations were almost always done mentally, without the help of writing down intermediate steps. Jan's intellectual ability allowed him to circumvent the physical disability.

In Brad's case, one of his math teachers came to the realization that he understood the material better than his aide:

> Teacher: I could tell by his frustrations when she did not write down what he wanted her to, or when I did not understand his questions, he was really frustrated about it . . .
>
> Interviewer: So at first you wondered how much he was doing and how much the aide was doing, but you decided that he was pretty much doing it then?
>
> Teacher: Yeah, because he would catch mistakes, like if Pam broke the problem down wrong, he would get mad . . . I would call on him in class, when I teach I do a lecture form and ask them what is the next step we would do. I would wait for Brad to spell it out, so I knew that he was spelling it out . . . Pam didn't have time to figure it out any faster than Brad did. (Interview, 5/14/92, pp. 1-2)

The teacher was skeptical at first, but then realized by seeing Brad's reactions to Pam's mistakes that he did indeed understand, perhaps better than Pam did. However, the teacher's initial attitude that Pam must be doing the work was not confined to this one teacher, and this interfered with the recognition of Brad's abilities by others.

Analytical Reasoning Ability

There is some evidence in the fieldnotes to support the idea that Jan's reasoning ability is advanced. His first grade teacher's opinion is unequivocal:

> You know, his reasoning ability is terrific. . . . This week they're doing a creative thinking page where they're supposed to say, "You know your pet canary is spoiled when . . ." and they're coming up with free responses. Jan's responses are things like, "You know your pet dog is spoiled when you roll over on the floor and he gives you a bone." I mean those are not responses that you normally get from first and second, even first and second grade gifted children. These [responses] are much more. (Interview, 3/22/90, p. 2)

The teacher attributed such responses to reasoning ability—ostensibly the capability to mentally reverse roles. It might be argued that this also shows creative ability. Also, compared to the responses of the other children, Jan's were more sophisticated. This is particularly striking when one remembers that this is a class of twenty-four gifted children, and that more than half of the children were one grade level above Jan.

Jan was also adept at using deductive and strategic thinking, particularly in playing learning games in the classroom. One additional event that represents Jan's deductive thinking ability is presented below:

> [The students] then play a game with the classroom aide. One student tosses a nerf ball with fringe, saying "Ships a-sailing." The recipient says "Ships arrived." Thrower: "What's your cargo?" Recipient must give an answer following a certain rule. The fourth graders have played this before and know the rule, but the third graders have to try and figure out the rule. Pairs of items such as mud and slush, bananas and watermelons, macaroni and kangaroos work; water and fish, pen and pencil, elephants and peanuts don't. At one point Jan vocalizes. No one pays attention. Jan gets another turn and spells iron and helium. Everyone claps—that works. He is the first third grader to figure it out. They throw to Jenny at one point. She doesn't get it. At the end of the game, three third graders (Lisa, Amy, and Jan) have figured it out. I haven't. (Fieldnotes, 10/30/91, p. 4)

By observing the recipients' responses Jan was able to deduce the rule more quickly than at least two adults in the room, and before all the other third graders.

Artistic Ability

Though not strictly an intellectual ability, Brad's artistic talent was recognized. His art teacher was very impressed with his paintings, and Brad had won first and second places in an art show. His occupational therapist tried to find an art contest for adults with disabilities, because she had been amazed at his work. Pam related what Brad said about his artwork:

> He said well, if he couldn't make a living with his mind then maybe he could with his head because he does his artwork with his head. (Interview, 5/7/92, p. 2)

Brad himself seemed to recognize that his work was exceptional. Perhaps more amazing than the finished product was the way in which it was created: Brad has a special headgear that attaches the paintbrush to his forehead, and he paints by moving his head. At times Pam moves the canvas so that he can get the desired brush effect. The finished paintings betray none of the labored, jerky movements which created them.

Other Evidence of Academic Abilities

Jan demonstrated his advanced academic ability on standardized and classroom tests, in social studies and science as well as in math and reading. His third grade teacher related his scores in social studies and science:

> He almost always makes the highest score on any test that I give in social studies or science, which is quite unusual. He usually . . . will score as high or higher than any fourth grade child. I normally grade third and fourth grade . . . I give them the same test because they use the same curriculum, but I grade them on different scales. But he's always at the top of the scale for both classes. I don't think there's ever been a time that he hasn't had the highest score. (Interview, 2/10/92, p. 2)

The teacher's assessment that this is unusual is borne out by Jan's scores on the statewide standardized test, on which Jan scored at the ninety-ninth percentile in every subtest. Observational and "testimonial" evidence is thus substantiated by "objective" measures.

The administration of the tests was modified somewhat to make it possible for Jan to respond. On multiple choice tests, Jan dragged his hand down the list of answer choices and stopped on the correct one, which Jenny then bubbled in. She said that she never read the questions so that she would not inadvertently give the answer away. On essay tests, Jan spelled his answers and Jenny transcribed them.

Brad's scholastic success was demonstrated on his report card. According to his mother, Brad has always made good grades in school:

Mother:	He's always made the honor roll except in sixth grade once in science he got a C and he was really upset with the teacher, but the next time he got an A+. He really got in gear. (laughs)
Interviewer:	Didn't like that C, huh?
	(Brad makes a sound)
Mother:	A C keeps you off the honor roll and he didn't like that. But otherwise he always made the honor roll. (10/2/90, p. 6)

His mother showed me his report card, which corroborated this statement:

The report card reads:

Art	A Outstanding performance
English	B
Speech	A
French 2	A
Geometry	B+
Physical Science	B+

Brad's high grades in these academic subjects are evidence that his teachers believe that he knows the material and that his performance on homework and tests has been above average. Note that Brad has taken subjects which ordinarily would not be thought possible for a student with his disabilities: art, speech, French, and geometry. Brad does not have the motor control to paint, draw, or do geometric constructions, yet he has done well in both those courses. He cannot speak, yet he attained As in both speech (by composing speeches orally presented for him by others) and French (by spelling out his responses to oral exercises). This indicates his motivation, ability, and his teachers' willingness to modify their expectations for him.

Brad was recognized for his scholastic achievements by being inducted into the National Honor Society, and in 1988 by receiving a presidential academic fitness award, signed by Ronald Reagan. He also was made student of the month for October of 1991.

Jan's and Brad's profiles of academic abilities are quite different, just as one would expect of any gifted students. The opportunities provided for them speak to the openness, perceptiveness, and flexibility of their teachers. Allowing the students to complete work in a different way and being willing to make modifications in expectations resulted in the expression of extraordinary talent. The willingness to allow the students to respond using alternative modalities was crucial to the students' success and subsequent development.

Quickness

Jan surprised people with the speed at which he completed tasks, especially reading, and the rapidity with which he learned. It seems that he can spell out his answers as quickly as his classmates can write them. His first grade teacher told about Jan's ability

to finish all the assigned work, even when he only attended school half days due to a heavy therapy schedule:

> Well, when he comes back on the days when we have reading in the afternoon, then the next day he's got a double reading assignment and so he's picking up the afternoon reading assignment in the mornings that he's here, as well as doing all the morning work. And it's still all getting done. (Interview, 3/22/90, p. 4)

Thus, Jan does more work per classroom hour than do the other children. Jan appears to keep pace with his nondisabled classmates. In part this may be because of the extreme rapidity with which Jan reads. On one occasion I timed Jan's reading, and found that he finished two full pages of text in fifteen to twenty seconds. If the page included a picture, it took a little longer—about thirty seconds. He finished the entire book in eight minutes (Fieldnotes, 10/16/91, p. 4).

Jan's apparent ability to absorb information also relates to his ability to "catch on" to things quickly. Jenny and his teacher agreed that he is able to grasp information at a rapid rate:

> Interviewer: What about the ability to catch on to things quickly?
> Jenny: Oh, I think that happens pretty fast. I think his mind—his muscles may move all the time with uncontrollable urges, but I think the mind works all the time and is very controlled. I think he's on top of most everything. (Interview, 7/15/92, p. 6)

> Interviewer: So you think that he catches on to new things quickly.
> Teacher: I know he does. I mean, there's just no question that he does. First of all he wouldn't know all the things he does if he didn't catch on to things quickly, 'cause nobody's ever sat down and taught him anything. . . . [These are] all self-learned things. The only instances that I've ever seen that are things like when I sat down one day to show him greater than and less than. You only needed to show him that one time—he knew from then on what you were doing. (Interview, 3/22/90, p. 6)

It seemed that one exposure to a piece of information was all that Jan needed in order to comprehend and remember it. Even if, as Jenny said, his body was undisciplined, his mind was very controlled.

Brad also seemed to be able to learn easily and quickly. His mother described his learning of the Morse code:

> Interviewer: Did it take you a long time to learn the Morse code?
> (Brad makes a sound)
> Mother: He seemed to pick it up pretty easily. Thank goodness we didn't have to learn it, only him (She laughs). (Interview, 10/2/90, p. 5)

Pam also thought that Brad learned easily, especially in math and French. One of Brad's classmates expanded to include the idea that Brad was very aware of his surroundings:

> . . . I think . . . one of his strongest [abilities] is he is aware of things. (Interview, 5/14/92, p. 4)

Indeed, if Brad were not alert, he would not learn as easily as he appeared to learn—many repetitions would be needed.

Curiosity

What must it be like to be a "real curious kid" who "likes to be stimulated and can become bored very quickly with routine" (Interview, Jan's third grade teacher, 7/2/90, p. 7), and to have no way to go out and explore the world and satisfy that curiosity? Asked about Jan's curiosity, Jenny responded in this way:

> I think he's grown into that more since he's been in these classes. I think he's always been curious, but there wasn't a way to carry it out. (Interview, 7/15/92, p. 7)

As Jenny said, Jan has always been curious but prior to school had no way to carry that out. Since coming to school, however, he has taken every available opportunity to explore things.

> [Jan] had gone to the noon interest group [which was] an enrichment type program that kids could sign up for. Each child gets to go to two of them during the year. This one is on gyroscopes, and Jan was very excited about it. The other one (shown on the chart) that Jan chose was rollerskating. I ask how that will work. She chuckled and said that he is happy if he can just watch the other kids. He also signed up for the one she did earlier in the year on calligraphy; even though he knows he'll never be able to do it, he still enjoys watching and wants to know about it. (Interview, 3/22/90, p. 5)

Being curious to the extent of choosing to find out about things one knows one can never do is curious indeed. Curiosity probably had a great deal to do with the amount of knowledge Jan had accumulated without formal teaching. He availed himself of opportunities to learn about things, and he remembered what he learned to a great extent.

Brad was not observed to demonstrate a great deal of curiosity during the study, nor was he described as particularly curious by his family and friends. This was perhaps due to the effects of his illness—it is difficult to demonstrate or satisfy curiosity when one is concerned about being able to breathe.

Insight

Jan appears to be able to delve below the surface of what is said or done and see the motivations underneath. This is exemplified in two pieces of Jan's writing. First, a definition from Jan written on the first day of third grade:

> "Frontiers" means things you have not tried before. Like the first time you walk or talk. Any time you attempt something that seems impossible. (Document)

"Frontiers" was to be a theme in social studies that year as they studied state history. Jan applied the word to his own situation in a way that was quite unique; he went beyond the literal meaning of frontiers to a more abstract level, and appeared to see himself as confronting frontiers. To see frontier as an analogy for setting out to do things which are difficult requires abstract reasoning, and to apply that to your situation as a child with a disability requires insight.

The second of Jan's writing samples which shows insight is a poem, written the night before Jan's seventh birthday:

My Song

Poems are nicer than letters
Because they have a song in them.
My gift to you is the tune I write here
Listen quietly for my voice—
I may quit speaking at any moment
But I can never stop singing.
—(Fieldnotes, 9/13/90, p. 2)

Jan yearns for others to listen for his song (his inner self) and not his speech (the outward manifestation). This recognition that the outward appearance and the inner truth differ is the essence of insight. He appears to understand himself and his situation very well.

Jan also applies insight to the needs and feelings of others. When I asked Jan if he had a message he would like to give to the world, his response was, "I would like to save everybody from silence who is in silence" (Interview, 6/1/92, p. 1). His mother calls this his mission—to help other people with disabilities. A powerful anecdote relating to this mission was retold by Jan's mother:

> At OT at the hospital last Friday and his therapist had a woman visiting who was borrowing equipment. Her job is integrating all the preschools in the county to get handicapped kids into regular preschools. And Jan just seemed to kind of like her and he jumped over to his board and he said, "Karen should visit my school." And Debbie his therapist said, "Oh, why Jan?"—just to get him to talk so Karen could see him talk. Obviously we thought "Well, to see me do my stuff." He said, "To see me teach the ostriches." And he was laughing, when he gets tickled he just goes crazy, starts cracking up. "To see me teach the ostriches." We're all laughing. "Jan, are you just being silly? Who are the ostriches in your school? Is this a name you have for somebody?" He jumps on there again and says, "Ostriches are people who don't think handicapped people know anything." Another one of those {gestures} blew us away. . . .That mission already that he has and accepts that. It's just very, very recently that he's begun speaking of himself as a handicapped person. And, of course, that doesn't mean that he's not still trying desperately to walk and talk like everybody else, but somehow he's added to the equation who he is and his handicap, not just, "I'm the little kid who likes cars and likes horses." (Interview, 9/27/90, p. 3)

For Jan to make the analogy between ostriches and people who refuse to see what (to him) is obvious is insightful indeed. He also not only applied it to his own situation, but saw himself as doing something about it. Ellen described another instance of Jan enacting his mission:

> She mentions one boy named Nicholas who is placed in a moderately retarded class. He had written to Jan. . . .He said that he was in a "poop-stupid" class. Jan was so upset that he wanted to send the psychologist who had tested him up there to test Nicholas. [His mother] said that Jan felt that that was part of his mission—to help other kids. (Fieldnotes, 12/9/91, p. 3)

The magnitude of taking on such a mission and the realization that he could positively impact the lives of others shows a great deal of maturity on Jan's part, as well as insight into the motivations of "ostriches." This is unusual in a child Jan's age, and is further evidence of Jan's intellectual abilities.

Sense of Humor

Jan's teachers, Jenny, and two classmates all characterized Jan as having a good sense of humor. His written work often included puns, and Jan also wrote a story intended to poke fun at Jenny (called here Mrs. Frome) and her allergies:

Mrs. Frome's Nose

> Mrs. Frome's nose causes her to make strange noises. When she blows her nose, my nose runs, too. Sometimes when she sounds, dogs howl and the traffic stops. After the gust is over, the streetlights come on before the dust has settled. . . . (Fieldnotes, 10/14/91, p. 1)

Jan's use of hyperbole and the images he creates again demonstrate his verbal ability; the humor in the story is self-evident. Jan's mother also indicated that she and Jan use humor to deal with frustration:

> We have to turn it into comedy because otherwise we'd want to kill everybody, right? (Interview, 6/1/92, p. 5)

Thus, in addition to humor being evidence of Jan's intelligence, it also was used as a coping mechanism to deal with the conflict and frustration he faced daily.

Brad also used humor to deal with the stresses of having cerebral palsy:

> I think, for the most part, he has a sense of humor. I think that's what saves him from taking things so seriously all the time and getting him down. I think he looks to the lighter side of things. I know there have been some situations with his handicap that I've felt uncomfortable around him. I've sort of bent over backwards to avoid it and then I ended up making a fool of myself. He's been able to understand that and laugh it off with me and not make me feel uncomfortable about it. . . . You don't ever think of Brad telling a joke, but yet the sense of humor is to laugh at the same things we all do and to still laugh at some of the things of his handicap that he knows people struggle with. (Interview, Teacher, 5/14/92, p. 4)

Thus, Brad uses his sense of humor to help others to feel less awkward and to minimize the effects of cerebral palsy. He is able to see the humor in a very serious situation. This same ability has been used by Brad and his family to cope with the stress of his illness:

> As she reads a phrase "what food choices you have control over" Brad, Pam, and Brad's mother all laugh. Brad's mother brings in Brad's food. I say "speaking of food choices"; they all laugh. (Fieldnotes, 5/8/92, p. 4)

Even though Brad had been very upset that he had to eat through a stomach tube, he was able to see the humor in the situation. Brad also understood and laughed at jokes that his classmates did not understand:

> His sixth grade teacher . . . used to say, "He's the only kid that laughs at my jokes." (Interview, Mother, 10/2/90, p. 7)

Brad's understanding of adult humor indicates verbal sophistication and comprehension of abstract ideas.

Maturity

Being able to use humor to deal with stressful situations is one indicator of maturity on the part of both boys. Jan and Brad shared several other indicators of maturity as well.

Determination/Persistence

Neither Jan nor Brad would give up on a difficult task until it had been accomplished. Classmates, teachers, aides, and parents all characterized both boys as very determined. Following are some quotes relating to that determination:

> To watch that child [Jan] every day try to get dressed, every day try to, every meal, every bite, try to eat, try to erase that board, try to hold that pencil, and he never quits. (Panel presentation, Jan's mother, 10/15/91, p. 5)

> I don't know how soon it's going to get to the point where [Jan] can do these things independently, but it's going to happen because he's not going to quit till it does. (Interview, Jan's first grade teacher, 7/2/92, p. 4)

> [Jan] is determined to get [his work] done and to do just what everybody else does. For 6 years old I think it's incredible. (Interview, Jenny, 3/22/90, p. 4)

> Then Jenny has Jan do the problem on his calculator. He pushes the keys down, taking several tries to do each one. He just about gets to the key and touches it, but not hard enough. Then his hand reflexes backward and he has to bring it into position again. . . . Jan makes lots of sweeping motions trying to clear the calculator. He tries a minimum of 3 times before getting it. (Fieldnotes, 2/5/92, pp. 7-8)

> We have one day [at camp] where we do like a marathon type thing at this course, and the children do it any way they can. If they have a walker, they do it that way; if they can push themselves, they push themselves. Well, Brad pulled himself the whole course. . . . We tied bandanas in a circle. Someone held one end, he grabbed the other and would pull. And he'd pull, you'd step back, he'd pull again. He pulled his wheelchair the whole way. . . . It had to have taken him an hour and a half to do it. (Interview, Brad's camp counselor, 5/27/92, p. 6)

> [Brad's math teacher] saw Brad's determination in a slightly different way:
> He has been sick. This made me really think about his determination because I thought what does he really have to live for? He can't talk. He can't walk. Can't play and he has to sit and watch kids take those things for granted. He has to watch them talk. He has to watch them walk. He has to watch them play basketball, but yet he has never given up. (Interview, 5/14/92, p. 3)

Jan and Brad kept on trying difficult things day after day, never giving up, and in some cases, never succeeding.

Patience

Perhaps Jan and Brad have developed extraordinary patience because of their lack of ability to do things for themselves. Teachers, aides, and classmates all remarked on the patience shown by the two young men:

> [When I was first learning to work with Jan] he would wait on me. You know, like I'd go "What?" because I didn't know the hand, the control at that time and I wasn't sure what letter he went to. So he'd kind of stop and then he'd do it again so I'd get it right. Just like, "Okay, I'll show you one more time," you know. . . . And if I would say to Jan just a minute, you know, or say I have to go get something, it never bothers him, he just waits and then goes on. (Interview, Jenny, 3/22/90, p. 5)

> [Jan had] incredible patience for what he had to overcome. I didn't ever really see frustration in him. (Interview, Jan's first grade teacher, 7/2/92, p. 7)

> I know that when I first went in there [Brad] had to be extremely patient because he would show me his numbers and then I would have to look on his chart and then I would have to get used to how he and Pam did things. (Interview, Brad's classmate, 5/14/92, p. 4)

At relatively young ages, Brad and Jan had developed patience that many adults do not have. This patience helped them to deal with the many frustrations that were concomitants of the disability.

Goal Orientation

Both Jan and Brad set high goals for themselves, and were determined to meet them. After graduating from high school, Brad wants to go to college. Pam tells about his career goal:

> He's hoping to work into his math and get . . . a computer set-up where maybe he could work with math in the future. And he's already checking into colleges. He'd like to go to college and work in some kind of an accounting area. And then his artwork . . . one of the things that [he] brought up . . . [was] that possibly if he couldn't use his brain, you know, then maybe he could develop his artwork into a way that he could possibly make a living for himself in the future to contribute to, you know, the household. But he has ambitions that, you know, not just being taken care of, but he'd like to contribute to the family or whoever is taking care of him. (Interview, 5/7/92, p. 9)

Brad has set goals which stretch far into the future, demonstrating his maturity and sense of responsibility. This goal orientation translates into motivation for his classes, which he sees as avenues to his career. Even in preschool, Brad had indicated that he would rather learn than sleep:

> [The preschool teacher] just kept working with him and he loved working with her so they went right on together. A lot of the other kids would take naps at school and stuff and he's never been one to sleep, so while the others were taking naps she was working with him. (Interview, Mother, 10/2/90, p. 8)

Brad's math teacher also noticed Brad's motivation:

> [E]ven when he feels sick, he wants to be here, like he's going to miss out on something. I think he shines at being motivated, way above and beyond the call of duty. And I think that gets the kids excited. (Interview, 5/14/92, p. 5)

Brad's motivation was so intense that it was contagious. He wanted to be in school even when he was sick. That motivation translated into working hard on assignments:

> He'll be working so hard on something and then he'll tell you something about something unrelated. . . . You kinda connect it and think, he wants this so that's why he's putting all this effort into this assignment right here—he sees that there's something in the future that he can use it for which, you know, kids in high school don't do that. They don't put it together. . . . But Brad will say something that you realize that he's connecting this with what it can do for him in the future. (Interview, Pam, 5/7/92, p. 15)

Brad was more serious about his schoolwork than were his classmates because he saw the importance of the lessons for his future. This is more maturity than some college students exhibit.

Jan's goal is not as concretely stated as Brad's—Jan has a fierce desire for independence. He wants to do as much for himself as possible, even though it requires much physical effort:

> Jenny asks if it is all right for her to type the last sentence. "Look at me if it is." He doesn't. Jenny says, "You type the first part and I'll type the last part." (Fieldnotes, 5/13/92, p. 9)

> [When we make the hummingbird model] I will have him measure. It's all of three and a half inches or so. He will measure the line. Then we'll cut an outline. I usually do that—he usually allows me. Then we'll cut. And he doesn't seem to mind if I have to do the outline work, as long as he gets to show you how long it needs to be and—like his bill, I'll ask how long and do you want it curved or do you want it straight? (Interview, Jenny, 3/22/90, p. 2)

Jenny showed awareness that Jan wanted to do as much as he could. Her willingness to allow him that independence is portrayed in the phrase "he usually allows me." Jan certainly had made clear his desire to be independent, to the extent that she felt that he would not "allow" her to do it for him.

Recognition of Limitations

A final aspect of maturity noted in Jan's case only was his recognition of his own limitations. Possibly the most poignant examples of Jan's maturity may be found in instances in which he admits that he *may not be able to realize all of his dreams* because of his disability. Jenny related a "conversation" she had with Jan:

> I asked him the other day when we had time in writing lab if he could have three wishes, would he want to tell me anything? And he said he has a fear. Well, I never heard him say he has a fear. And I said, "What do you have a fear of?" And he said, "I have a fear that I won't make all my visions." And so I asked him, "Are you afraid you won't walk?" or whatever. He's worried about the walking. . . . And so we kinda talked about it, I mean I talked to him and he went on the board. He really thinks that he'll walk, but he doesn't know if he'll do it (how'd he put it?) "as well as I should." (Interview, 2/7/92, pp. 3-4)

Jan's desperate hope to walk is tempered by the fear that even if he does, the way he will walk will not meet (his or others') expectations. This realization at age eight when other children are positive that they will be rock stars making a million dollars a day again shows a great deal of maturity. Jan does, however, have fantasies:

Interviewer: What do you want to be when you grow up?
Jan: I want to be a rider of unbroken horses! Well, I would still like to be a professor of math. (Interview, 6/1/92, p. 9)

The fantasy is there, but he realizes that it is very unlikely to occur, so, in the little word "well," he indicates that he knows the limitations and will settle for a less exciting job.

The conflict between having fantasies like this and knowing the reality, knowing that his intellect could allow him to succeed at any job and realizing that his body interferes, must cause Jan a great deal of frustration, yet with his patience, determination, and maturity in general he continues to be "the best he can be."

Thus, Jan and Brad demonstrated maturity in their determination and persistence, their patience, their goal orientation, and, in Jan's case, the recognition of their limitations. In Brad's case, his maturity seemed to be recognized by his parents, aide, and peers. They spoke to him as an adult, they asked for and considered his opinions even when those opinions conflicted with their own, they gave him choices about tasks to complete, and they trusted him to keep track of his homework assignments and even his medication schedule. In Jan's case, although his classmates characterized him as "pretty grown up," and Jenny assessed his maturity level as "well above his age," his teachers were more hesitant about assessing his maturity. Jan's third grade teacher felt that "his thinking is certainly more mature," (Interview, 7/2/92, p. 6), but felt that his reactions were harder to read. His first grade teacher concurred:

> That was harder to see because of the handicaps, because there was so little that didn't depend on, the things I see in maturity in children are their interactions with other people, how they handle themselves when they have to sit and wait instead of [being] busy doing something, how they respond to new situations, and so little of that Jan has any control over. I certainly didn't see instances of immaturity. I didn't see him bursting into tears at inappropriate times. I didn't see him picking fights with people, which obviously there aren't many ways to do. (Interview, 7/2/92, p. 7)

Here is an instance in which the disability again masks the recognition of the characteristic. The teacher did not see the same types of maturity she saw in other children, but did not think of the types of things mentioned by Jenny as demonstrating maturity. The instances in which maturity were shown were not situations which other children would encounter, thus, the teacher did not equate them with the same trait.

Using the Intellect to Cope With the Disability

One of Brad's and Jan's characteristics was not often used as an indicator of giftedness: the use of the intellectual ability to compensate for the physical disability. In Brad's case, this was evident in the facility with which he adapted to new ways of communicating and his invention of communication shortcuts, such as looking at one side of his communication board for "plus" and the other for "minus," or raising his eyes to indicate that a number should be squared. Oftentimes his communication partner would experience difficulty with a shortcut which Brad had assimilated easily. Jan tried to *use his brain to school his body* to obey his wishes, and to *make adaptations* so that he can cope with his environment. By concentrating, Jan was able to circumvent the damaged part of the brain and perform some motor functions. Jan also adapts to his environment constantly. As his best friend observed, "He's just had to change by just having a regular class." (Interview, 7/6/92, p. 4)

This aspect of intelligence—using the mind to adapt to the environment—is conceptualized by Sternberg (1985, 1986) as "contextual intelligence." Ironically, it is the disability that makes this type of intelligence apparent in the cases of Jan and Brad.

Summary of Indicators of Giftedness

Both Jan and Brad exhibited characteristics ascribed to gifted children by the professional literature: spontaneous early reading ability, advanced academic ability, the ability to quickly learn and retain information, sophisticated sense of humor, curiosity, insight, and an advanced level of maturity as evidenced by determination and persistence, goal orientation, patience, and recognition of limitations. In addition, they evidenced the ability to use their intellectual powers to circumvent the effects of the disability. As has been noted, the recognition of these characteristics was inhibited by the effects of the disability, particularly the communication barrier.

Brad and Jan also displayed intelligent behaviors according to the information processing theory of intelligence (Sternberg, 1985, 1986). Sternberg's (1986) model of triarchic intelligence consists of three subtheories, relating to three types of intelligence. The first type is *componential intelligence*, relating to internal processing. Componential intelligence is comprised of metacomponents (which perform higher-order processes such as planning, monitoring, and evaluating strategies), performance components (which are used in the execution of a task), and knowledge acquisition components (which are used in learning new information). The second subtheory concerns *experiential intelligence* in which internal processes interact with situations. Two aspects considered are a person's ability to handle novel situations, in which insight is required to solve problems, and the ability to automatize functions, in which rapid mental processing occurs without conscious effort. The third subtheory explains *contextual intelligence* in which a person's response to his/her environment is paramount. Persons may either adapt to their environment, shape the environment to meet their needs, or select a different environment which better meets their needs (Sternberg, 1986).

Jan and Brad displayed aspects of each subtheory. Beginning with the componential subtheory, both participants were very efficient in knowledge acquisition. It is difficult to assess the other two components: meta-components are covert, and communication barriers inhibit "thinking aloud"; and response components are blocked by the effects of the disability. Jan and Brad demonstrated facility with experiential intelligence: they, especially Jan, showed a great deal of insight in reacting to novel situations; and both seemed to be adept at automatization. This automatization was evident in rapid use of communication devices and in the ability to mentally solve problems at a rapid rate. Finally, Jan and Brad were able to implement contextual intelligence. Though not able to physically shape their environments, through their social interactions they influenced others to do so. They had little control over selecting their environments, but were extraordinarily able to adapt to the demands placed upon them. If intelligence is considered the ability to solve problems and adapt to one's environments, Brad and Jan gave ample evidence of intelligence.

The Importance of the Classroom Context

What elements of the classroom context and instructional methods made it possible for Jan and Brad to develop their intellectual abilities? A second focus of this study was to identify attributes of the classroom, both environmental and instructional, which aided Jan

and Brad in realizing their potential. Because the contexts varied considerably, they will be discussed separately.

Jan's Classroom Context

Jan was placed in a self-contained class for gifted students. Jan entered the program via a non-typical path. Due to his motor disabilities and inability to speak, his parents had him tested at age five to explore the possibility of sending him to a regular kindergarten the following fall. A psychometrist employed by the special education cooperative conducted testing at Jan's home. In the words of his first grade teacher:

> [A] set of three or four cards [contained] the possible multiple choice responses to the questions asked. Working on the floor with the choices spread around him and supported by another adult, Jan was able to indicate the response he desired. Jan . . . achieved the 99th percentile for his age. . . . (Panel presentation, 10/15/91)

After the testing, the gifted education screening committee made the final placement decision. They did not have identical information for Jan as for the rest of the students in the class, but in the words of gifted coordinator, the information was "comparable." The screening committee had a difficult decision to make: Here was a child who clearly possessed intellectual skills equal or greater than those of the other children who had been placed in the class, but whose motor skills were at least four years delayed and whose oral speech skills were non-existent. The committee was swayed by the belief of the teacher in whose class Jan would be placed that Jan belonged in the program:

> [The teacher] said, "He's got a glint in his eye, and I know." It was just, you know, her gut feeling from the very beginning that if this child needs to be in the program, we put him in the program. And I think that was a very important message from our teaching staff that she was very willing to accept that and just look at the child's needs. . . . That day at the screening committee, you know, it was decided that yes, he would be placed in the program. (Interview transcript, Gifted Coordinator, 3/23/90)

Thus, in what was probably one of the most important decisions in Jan s educational career, the committee was able to look beyond the physical limitations and assume the responsibility of assisting Jan to free his intellect from his dysfunctional body. The committee was not deterred by Jan's inability to complete exactly the same instruments as the other children. Multiple criteria for selection were employed, and the committee was flexible enough to consider alternative ways of expressing giftedness. Key also was the teacher's attitude that if Jan needed the special services provided by the gifted program, then that was what he would have, regardless of the obstacles she would face.

So it was that Jan found himself in a classroom populated by children who were his intellectual peers. Consistent with published characteristics, these children exhibited advanced reasoning ability, a vast storehouse of background information, a high level of curiosity, a great deal of task commitment, and extraordinary independence.

The classroom context was intimately related to the characteristics of the students. The classroom had a relaxed atmosphere and the teacher was committed to the treatment of the students as persons with rights. This helped to make the students confident in taking intellectual risks, i.e., to develop their critical and creative thinking abilities. The relaxed atmosphere and the respect for students also dovetailed with the students' independence; they did not require the constant supervision of the teacher and the resulting freedom helped

them to further develop their independence and task commitment. The teacher employed an individualized curriculum which recognized the students' academic capabilities. This was one more way in which the students were treated as persons with rights since each student had the right to have material that challenged him or her intellectually and to progress at his/her own pace. The individual choices made by the students also encouraged their development as autonomous learners. The teacher placed emphasis on achievement, recognizing the students' capabilities and seeking to engender their pursuit of excellence. Finally, the learning activities correlated with student characteristics. The development of thinking abilities was designed to further the students' reasoning ability. Advanced vocabulary and content related to the students' broad background knowledge, curiosity, and the ability to handle a higher level of abstraction. Simulations were also geared to abstract thinking and the ability to see relationships and make connections. Thematic units capitalized upon this ability to see relationships and drew upon background knowledge. Thus, the classroom context both reflected and developed the characteristics of the students.

This context was important for Jan in several ways. The atmosphere of the classrooms encouraged students to find joy in learning and to express themselves freely. This safe environment was important for Jan; in order to succeed he needed to be willing to take risks. He was supported and encouraged to do so, and was respected as an individual with his own set of strengths and weaknesses. His teachers set goals for Jan's participation in the classroom:

> My personal goals for him were to be as much a part of this classroom as it was possible to make it. (Interview, First grade teacher, 3/22/90, p. 1)

> Interviewer: What was the goal that you had for Jan in your class?
> Third grade teacher: To be able to take part as much—as normally as possible as [any] other child in the class. That he would be able to participate in the gamut of activities. (Interview, 7/2/92, p. 4)

Thus, Jan was integrated as fully as possible, truly a part of the class as opposed to apart from it. His teachers considered their instructional modifications for Jan minimal:

> I anticipated having to modify all kinds of materials in order for him to take part, and we haven't modified, we don't even. . . . I don't even think about the fact that he's in here now when I'm planning things. They just do it. What he can't handle himself physically, Jenny does for him. So his hands are on it and he's doing it. (Interview, First grade teacher, 3/22/90, pp. 1-2)

Jenny made it possible for Jan to participate in virtually all class activities. He did the same workbook pages, read the same selections, participated in the same computer work, took part in discussions and simulations, went on the same field trips, and watched the same films. His work in some areas, like math and spelling, was different not because of his disabilities, but because of his advanced intellectual abilities.

The classrooms emphasized achievement, mirroring Jan's own drive to achieve. Jan's gifted peers in the classrooms shared many of his characteristics, enhancing his own feelings of belonging and creating the need for a specialized curriculum which was especially beneficial to Jan. Finally, the classrooms were highly individualized, allowing Jan to proceed at his own pace. Jan required the flexibility to progress quickly with intellectual tasks and slowly with physical tasks; the classrooms provided this flexibility. Jan's first grade teacher captured the appropriateness of an individualized program for Jan:

> The whole class was already set up in terms of people moving at their own pace, in terms of using lots of different kinds of media, in terms of using lots of different kinds of materials, and so the adaptations that you needed to make for Jan were not noticeable. . . . I think it also softened, or lessened, the perception of the other kids on how different he was, because they were also doing their own thing. . . . [I]n a classroom where everybody was doing the same thing, it would have been very obvious that he couldn't answer the question when it became his turn or that he had to work somewhere else because he couldn't manage in the seat or any of those things that were just kind of normal adaptations went largely unnoticed in the classroom. Also because we were using books at different age levels than the normal first and second grade. Because we were doing things that there was more input maybe, more discussion kinds of things and Jan received input just like any other kid. . . . [H]e was no different than any other child in terms of his intellectual needs and the stimulation and stuff that implies, but I think the fact that the classroom operates that way meant that he didn't stand out as being as different as he was. (Interview, 7/2/92, p. 2)

Certain instructional activities were especially beneficial for Jan:

> Well he reads very quickly and comprehends very well. I think he probably got far more information when the assignment was using some kind of reference book or something. . . . The kinds of hands-on things he particularly enjoyed because it was something new and different . . . and he liked things where he was in the midst of the kids. . . . (Interview, First grade teacher, 7/2/92, p. 3)

> I do think the writing—I think the writing gives him a chance to unlock everything he's held inside, and he can . . . when he writes stories it's like a little section of his mind opens up and he just writes everything. . . . I think the ones where we go out on a field trip, when we went looking for crinoids and all that, where he can put his hands in and do just, just get out there and do what everybody else has done, get dirty, you know, get the sand and it doesn't make any difference that he's got dirt on, because everybody else is that way. (Interview, Jenny, 7/15/92, pp. 2-3)

The teacher and Jenny named several different types of activities, but all were similar in that they either provided new experiences—ways to satisfy his curiosity, ways to be part of a group—or allowed him to express himself. Both mentioned hands-on type activities, and this is a type of activity which is often not experienced by children with physical disabilities—they have no independent way to gain hands-on experience with the world. Jan concurred with this:

> Interviewer: What kind of learning activities help you learn the best? Are these the same ones that you do best on?
> Jan: Science experiments because I touch everything; yes. (Interview, 7/92, p. 1)

Jan wanted to be able to touch things and have the types of experiences as the other children. However, there were certain curricular modifications which were necessary, and which again set him apart. Some activities (such as handwriting and the regular physical education class) were omitted due to Jan's physical limitations. Jan was occasionally given extra time to complete tasks, and in rare cases he was not included in the group. In general, though, Jan's particular needs were well met in the context of the gifted classroom, and the intellectual challenge and the individualization provided were especially suited to his needs.

Brad's Classroom Context

It is difficult to assess fairly Brad's school experiences due to the home tutoring resulting from his illness. From limited observations in the school setting, two major characteristics of the school were noted: traditional structure and positive atmosphere. All of the classrooms in which I observed at Elm High School were structured very traditionally: the students were seated in rows, they listened and took notes while the teacher provided information, and they responded to teacher questions. Several of the teachers did allow students to work together on assignments. The pace was set by the teacher, and all students worked on the same assignment at the same time. Teachers attempted to keep students quiet, in their seats, and focused on the same task. The learning tasks were also quite traditional. The textbook formed the basis for class instruction, and tests were comprised of factual knowledge.

The other major impression of the classes at Elm High School was that there was a pervasive, positive atmosphere. Teachers and students seemed to treat each other with respect, and there was a good deal of banter in the classes between students and teachers. On the teachers' part, there was a general feeling of caring for the students and enjoying being in their company. Students seemed to like and respect the teachers, and to feel quite comfortable in the classes. There were few discipline problems, and the only misbehaviors I observed were quiet chatting and inattentiveness.

In summary, Elm High School was a pleasant place to learn. The classrooms and learning tasks were structured traditionally, and most students and teachers seemed to be comfortable with that type of environment. The atmosphere was conducive to encouraging students to learn and to express themselves. The structure afforded little individualization within classes, but to some extent students were able to choose the classes in which they enrolled. Teachers emphasized respect for everyone in the classroom and stressed achievement. This respect was shown to Brad as to the other students, and facilitated his acceptance into the classrooms. The orientation toward achievement matched his own educational goals.

Brad's classroom contexts affected his development in several ways. The traditional structure of his classrooms did not allow for individual pacing or individual choice of activities within classes, but the extracurricular opportunities of which Brad availed himself and the course choices he made did allow some individual choice. The format of lecture and recitation made extensive participation by Brad difficult, and the modifications in expectations for the amount of written work were few. However, Brad seemed to be very comfortable in classrooms and, before becoming ill, had no difficulty in keeping up with the workload. Perhaps the high expectations resulted in higher achievement.

It is even more difficult to discuss activities beneficial to Brad, since most of the tutoring activities were of the same form. Pam reported that Brad learned best from lecture and discussion and had difficulty with textual material due to visual focusing problems.

Summary of the Importance of the Classroom Context

These classrooms exhibited a number of characteristics which have been recommended in the literature as appropriate for gifted students with disabilities. Both were in a mainstreamed setting, with opportunities to interact with nondisabled peers, (as widely suggested in Hemmings, 1985; Maker, 1977; Whitmore, 1988; Whitmore & Maker, 1985). Corn (1986) suggested that students be given access to gifted programs; Jan was placed in a gifted program, while no gifted program existed in Brad's school.

There was a facilitative atmosphere in both schools in which students were heard and accepted and importance was placed on each individual and his/her responses (Feldhusen & Hansen, 1987; Hultgren & Seeley, 1982). Jan's classrooms allowed for active inquiry, allowed him to be creative and self-expressive, encouraged sharing with others, and involved him as an active member of the class, as recommended by Whitmore (1982). The opportunity for higher level thinking activities (Hemmings, 1985; Whitmore & Maker, 1985) and a balance between basic skills and science, humanities, and art activities (Whitmore, 1982) were also provided in Jan's case.

There were some actions performed by the various teachers which seemed to be especially facilitative. Teachers in both settings endeavored to involve Jan and Brad in classroom discussions and activities, and had the patience to wait for them to respond. They provided individual help as needed and most were open to modifications in the curriculum to minimize physical frustration. In both settings high expectations were held for all of the students. All of these have been recommended in the literature (Feldhusen & Hansen, 1987; Maker, 1977; Whitmore & Maker, 1985).

To this point, the importance of the teachers in this study has been understated, due to the focus upon the perspectives of the participants. However, it must be noted that these teachers made many, many accommodations for Jan and Brad, and were it not for their flexibility, the extent to which intellectual development occurred would have been severely limited. These teachers took in stride the enormity of the task of integrating students with severe disabilities into a regular classroom, and nonchalantly accommodated for them in innumerable ways. For instance, Jan's first grade teacher alternated her reading and math classes daily so that Jan, who left at noon, would be exposed to each. However, when I asked her what kinds of modifications she made for Jan, *she did not even mention this.* This type of flexibility and the willingness to restructure certain expectations was observed frequently in both cases, as was open-mindedness regarding the expression of cognitive abilities in unusual ways. The teachers did this as a matter of course, making no special notice of it. This is mainstreaming as it was intended, and these teachers must be commended for their skill in meeting the individual needs of Jan and Brad while simultaneously attending to a classroom full of other students.

Thus, it appears that many of the recommendations found in the literature were enacted, especially in Jan's case. Jan's classrooms appeared to be more conducive to the development of high intellectual abilities, and Jan appeared to flourish. His characteristics seemed well matched to the classroom context. In Brad's case, although he did achieve well, there was not the same emphasis on intellectual development, which might have enabled Brad to excel to an even greater degree.

It is important to note at this point that there were two students not involved in the final study but whom I had observed in their classroom settings. Physically their conditions were much the same as those of Jan and Brad, and their parents observed many of the same behavioral indicators of giftedness recognized in Jan and Brad. However, they had not developed a means of communicating yet. They were not able to read or spell, so they could not use the systems of Jan and Brad. Their classrooms, both special education rooms, involved curricula with little academic content. As a result, in my opinion, there was no opportunity for the students to develop their intellectual abilities. Since there was no instruction in reading or spelling, it seems likely that these students will have difficulty in applying such skills to their communication needs. This points out the crucial nature of the classroom setting upon the cognitive development of such students.

Implications for Educators

Based upon the experiences of the teachers and students in this study, a number of effective practices were identified. Educators faced with students similar to Jan and Brad may wish to consider the following:

1. Actively seek gifted students among those who have disabilities. Avoid overgeneralizing disabilities.
2. Attempt to learn the student's symbol system. Facial expressions, gestures, and vocalizations, as well as words which are spelled out, are means of communication. By closely observing one can develop the ability to more accurately read intended meanings, as did the teachers of Jan and Brad.
3. Attempt to get feedback on interpretations of messages. Check for understanding. Realize that the student may "settle" for an inaccurate but close interpretation of what was meant, as did Jan and Brad.
4. Allow the time to communicate messages. Avoid excluding these students from discussions. This sends the message that they are not worth the time it takes to listen. Also allow time for more than one word or yes/no responses—the complexity of thoughts is well worth the wait. The beauty of poetry like Jan's cannot be elicited by multiple choice.
5. Treat these students as any other student—speak directly to them, include them as much as possible in all activities. Make them active members of the class.
6. Facilitate social interaction at first, and then allow classmates to take over. Children rise to such occasions and soon treat the student with a disability as an equal.
7. Encourage cooperation in learning tasks and switch partners often. This will increase the number of different partners who work with the student with disabilities.
8. Be flexible in modifying instruction as needed, but modify no more than necessary. Too much special treatment sets the child apart.
9. Provide as many different types of learning experience as possible, through many modalities. Either vision or hearing is often affected; use both modalities to insure maximum input. Always endeavor to include tactile experiences and real life explorations, such as field trips. In this way curiosity may be nurtured and satisfied.
10. Individual pacing of skill areas is very beneficial, as is individual choice of activities.
11. Have high expectations for students with disabilities—look beyond the disability for the talent inside.

Conclusion

This research investigated the manners in which gifted children with cerebral palsy and no speech manifested their cognitive abilities, and the ways in which their educational settings facilitated the development of their cognitive potential. A number of indicators of cognitive ability were identified, and facilitative and inhibitive aspects of the educational settings were described. It is hoped that this study will contribute to the development of the potential of students with physical disabilities and no speech—not only for the participants of this study, but those who languish unrecognized in countless classrooms.

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Appendix A

Samples of Jan's Poetry

My Song

Poems are nicer than letters
Because they have a song in them.
My gift to you is the tune I write here
Listen quietly for my voice—
I may quit speaking at any moment
But I can never stop singing.

News in January
(on the Persian Gulf war)

Cold stars all around.
Today they say we are going to fight far away.
Where have our young soldiers gone to hear the bells?
Please let them pray for peace
Quietly under the desert stars.

Pilgrims in the Night

Domes of the cathedral gleam in the moonlight
Questing pilgrims, hoods pulled low,
Pass my cozy bed.
Where in the wide world
Might they be going?

Lost Seeds

Poems are meant to be pomegranates
Like my poems for no one.
Days go by because I just forget
    how I felt.
Poems can steal no one's imagination
When they rot on the tree
    like unpicked fruit.

Christmas Poem

Santa Claus brings joy to girls and boys.
Antlers gleam in the light. What a lovely sight.
Night of wonders and delight.
The star of Christmas shines above.
All the world wrapped in love.

Appendix B

Suggestions to Parents of Gifted Students With Cerebral Palsy

At Home

1. Look for subtle signs of intelligence, such as laughter in response to a humorous comment, understanding of cause and effect in playing with a toy, or looking at the door or clock in response to a comment like "Time to go."
2. Provide as much stimulation as possible. Reading to your child while he/she can follow along, watching educational programs, borrowing books on tape, going on educational outings to historical sights or museums, and providing as many "hands-on" activities as possible will help to slake the thirst for knowledge. Since your child may not be able to explore the world independently, any activities you provide will be welcomed.
3. Search for a communication system by which the child can give a free response; that is, spell out an original message. Many communicators come with "canned" messages that are insufficient for the needs of gifted individuals.
4. Seek the support of other parents whose children share characteristics with yours. They can provide a wealth of information and emotional support. Become involved with organizations focusing on your child's disability as well as with organizations for gifted children.
5. Locate books in which the hero/heroine addresses some of the challenges faced by your child (bibliotherapy). Identifying with the main character can sometimes add a new perspective.

At School

1. It is important for you as parents of gifted/disabled children to have more than usual contact with your child's teacher(s). In this way you can both receive and provide information that your child may not be able to convey.
2. Strive to develop a comfortable relationship between your child and his/her teacher(s). Teachers not accustomed to working with children who have disabilities sometimes feel uneasy or even threatened. Helping the teacher to know your child as a person will alleviate many misgivings.
3. When the school assesses your child's intellectual abilities, request modified testing procedures. A number of appropriate psychological tests may be administered using multiple choice procedures. A qualified examiner may adapt the administration procedure by taping large letters to the floor corresponding to the answer choices, or by requesting an eye-blink response when the correct answer is stated orally.
4. Request that your child's individualized education plan (IEP) include appropriate intellectual training, as well as appropriate remediation for the disability.
5. Seek to have your child placed in the gifted program, if available, or in a top-level mainstreamed class where the cognitive level of instruction is high.
6. See that someone (perhaps yourself) explains your child's disability and abilities to his/her classmates. Talk about some likes/dislikes that will help the children to recognize your child as more similar to them than different from them.
7. Teach school personnel your child's communication system. Don't forget about the "body language" cues your child uses, and the shortcuts you have developed. This is crucial for accurate evaluation and productive instruction.
8. Ask that your child be included in all class activities, except for those which are specifically precluded by the disability (e.g., handwriting). Small group work in particular will help to build relationships with peers.
9. Find a mentor—preferably an adult with a disability who has achieved in an area your child values. Meetings between the mentor and your child may focus on affective or intellectual issues. Both will be enriched by the association.
10. Trust your feelings about your child's abilities—even if it is difficult to get anyone to believe you.

Collaborative Research Series

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